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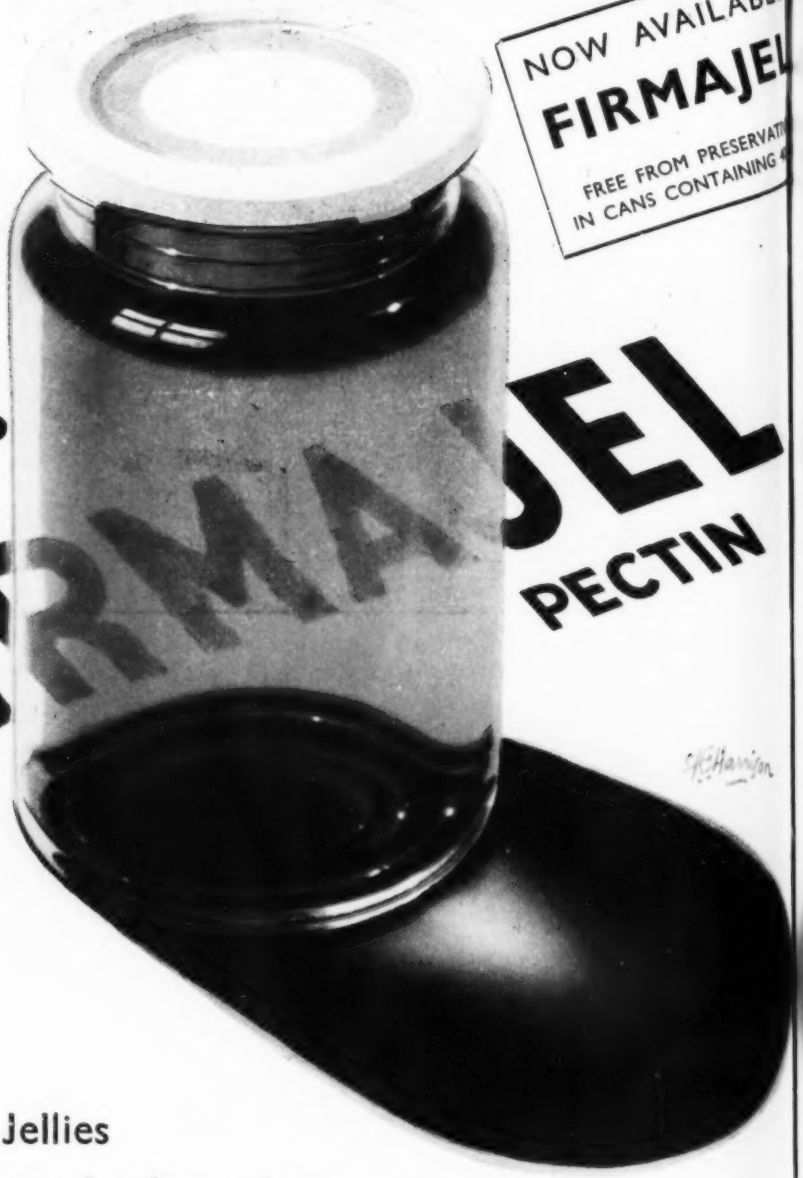

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FOOD MANUFACTURE

Vol. XXIII, No. 6 June 1, 1948

A Salutary Warning

WHILE the prospects for the coming year remain encouraging, the FAO statements issued in April are a salutary warning that we probably need two or three good harvests before we are out of immediate danger. Meat production in particular may continue to decline both in Europe and in North America, because of the short food supplies and the heavy slaughtering that took place late last year. To counterbalance this in some slight degree, European fish landings have been almost up to pre-war volume; and the prospects in the fisheries remain good, although the shortage of refrigerated transport may create some difficulties.

Meanwhile, the draft agreement on wheat reached by the main producing and importing countries has been to a small extent paralleled by the project in the Far East to form Rice Conservation Committees, whose aim would be to prevent the excessive wastage of rice between the paddy fields and the homes of the consumers. The establishment of an International Rice Council has further been recommended; and this Council, it is hoped, will come into existence as soon as ten nations have expressed agreement with the plan. It had been foreseen that the Far East conference of FAO might turn out to be the most momentous of its undertakings to date; and if measures can be taken to increase the production, limit the wastage, and improve the marketing of rice, the ultimate gain to the West may be incalculable.

The present rice position is that population growth still continues to outrun any effort to increase production. World production is still only 96 per cent. of the average pre-war output. But this, it must be remembered, is partly due to the rise of rice production elsewhere than in the Far East. There has been a spread of cultivation in Africa and in North and South America; but there has also been an increase of rice consumption in these areas. The result to date is that Asia, which before the war accounted for 96 per cent. of total world rice production, now accounts for 93 per cent., and it is in Asia that population shows the greatest increase. Undoubtedly, both in China and in India much would be gained through a more even distribution of stocks throughout the country.

Famine Ahead

The Shade of Malthus would probably smile if able to read the latest pronouncements of the experts on the world's food prospects. His theory, published in 1798, that population increases in geometrical progression, while its means of subsistence increases only in arithmetical progression, may not be far wrong, even if lands all over the globe have been cultivated since his *Essay on the Principle of Population* was published.

The FAO statements in April on the food situation dealt with immediate prospects and were not very optimistic; but they were nothing to the alarming warnings given by Sir John Boyd Orr in his recent address at London University.

There are now 150 million more people in the world than in 1938 and during the next generation it is estimated that there will be another 500 million, more at the very least, perhaps double this number. This increase of population is no new thing. In Europe it rose from 140 million in the middle of the eighteenth century to over 500 million, but in this case the needs of the increased population were met by the exploitation of the Western and Southern Hemispheres. Today there are no new continents to be discovered and in the new continents there is no more virgin land to be worked.

The greatest threat to the feeding of future generations is the wasting fertility due to erosion of the lands already exploited. This destructive process is proceeding today at an alarming rate.

It is true that attempts have been made by many countries, by setting up soil conservation schemes, to halt erosion, but the problem is so vast and so difficult that to be successful quickly enough there must be a pooling of resources and an intensity of effort equal to that made during the war to defeat Nazism. It is a tragedy that in the face of the threat to our civilisation through

decreasing land fertility so much of the effort of governments should be diverted to preparation for war which, as General Marshall has pointed out, no nation could possibly win.

Sir John declared that what is needed is to get the co-operation of the nations on a global scale to carry out the recommendations of the recently established World Food Council. If that could be done quickly there would be hope for the hungry people of the world.

Science has a predominant role to play in the avoidance of world destruction and the salvation of civilisation.

Scientific methods are available to stop loss of fertility of the land, and if they are applied soon enough, production could be increased faster than population could grow.

Dried Fruit Fears

Australia is perplexed about the possible effect of the Geneva tariffs agreement on the Dominion's market for dried fruits in Great Britain. The industry was established in Australia in 1891 and has been built up very largely on exports to the United Kingdom. In 1944 production reached 104,000 tons and provided a livelihood for 50,000 people. It is estimated that production could be increased to a figure between 150,000 and 200,000 tons annually, and that the Dominion could supply the full needs of the United Kingdom and the other importing countries within the Empire. Britain's potential market is some 80,000 tons annually.

Three successive bad seasons, due to adverse weather, have been experienced in Australia, and the 1947 crop of 56,000 tons of currants, sultanas, and lexias was allocated as follows: United Kingdom, 21,262 tons; Australia, 19,000 tons; Canada, 10,988 tons; New Zealand, 4,250 tons; and other markets, 500 tons.

The International Trading Organisation Charter drawn up at Havana as a complement to the Geneva agreement provides for the reduction of Empire preference in return for American tariff concessions. The United States produce 300,000 tons of raisins annually, and the home consumption is only 170,000 tons. The remaining 130,000 tons is available for export, but today, because of the world shortage of dollars, only a small part of this surplus can, in fact, be marketed. Australia fears that any interference with Empire preference will cause American dried fruit to displace the Dominion products on the British market. This would check the expansion of the Australian industry and reduce the standard of living over a wide area in the Dominion, which might have an adverse effect on the export of British goods to Australia.

Verbal Wisdom

Last December we drew attention to the excellent work of the Organisation and Methods section, a branch of the Civil Service specialising in modern systems of management. And now, also initiated by the Treasury, a guide to the use of English, entitled *Plain Words*, has been published. Written by a retired civil servant, Sir Ernest Gowers, this book deals particularly with those faults " to which official writing is specially prone;" the examples, both good and bad, are almost all taken from letters, reports, memoranda, documents, statutory orders, etc., written in recent years by one kind or another of public official. Is there one of us who has not wrathfully asked why " they " can never use plain English? The Treasury have revealed a commendable depth of imagination in having this self-analysing and self-critical book written, and in offering it for sale to the public at a low price instead of circulating it quietly among the various departments.

Many business men and anti-control politicians might well take note of one point made by Sir Ernest Gowers. We cannot expect too much easy reading in the English of Statutory Rules and Orders; yet it is all too often this kind of " Whitehall " prose that we most hold up to ridicule. This kind of English is not " Civil Service " English—it is legal English. Words and phrases must be used with certainty and precision, and in such a way, however cumbersome and ugly, that loop-holes are not left for cunning members of the community to exploit. The very M.P.s and business men who thunder against these complexities would be as quick on their feet as anyone in getting to a lawyer to have their own Orders or Dispositions so carefully drafted in legal English that no Court could later misinterpret.

If this suggests that Sir Ernest has produced an *apologia*, we hasten to explain that the remaining ninety or so pages of the book are devoted to admitting and analysing the common faults of " officialese " and to showing how they may be avoided. None of his plain words attempts to dodge this issue. But is this book only for the spell-binders of Whitehall and branches? Does the private business man never sin? Does the scientist never dress up his prose with verbiage? It will be a tragic waste of Sir

Ernest's notable effort if it is regarded as a guide to officialdom only. Thousands of men and women must spend appreciable parts of their days composing letters, and we need not assume that all the inhuman and incomprehensible letters are those signed by our "obedient servants." Sir Ernest Gowers's chapter on the composition of letters about individual cases and problems is a masterpiece of sense and sensitivity.

The correspondence files of private enterprise would bulge less violently if the Government issued an S. R. & O., to compel every "dictator" in or out of Whitehall to read this section of the book once a week for six months. Not only would letters be shorter; many less would be required, for both writer and recipient would get to grips with the main issue more quickly.

Suggestions from Australia

A novel method of bringing a little variety into the diet of factory workers in this country was put forward to a FOOD MANUFACTURE representative by Mr. Noel Curphey, Secretary of the Victorian Chamber of Manufacturers, Australia, who is in this country during his world-wide official mission on behalf of his organisation to investigate industrial developments and practices and economic conditions. His tour to date has covered New Zealand, U.S.A., Canada, and Belgium. Mr. Curphey thinks an appeal should be made to all Australian manufacturers to "adopt" a British factory, sending food parcels regularly to their counterparts in this country. Indeed, he asked, why not extend the idea and make a similar appeal to all those countries where food abounds?

Emanating from this, it might be possible to devise some scheme whereby those other than factory workers could also benefit from the generosity already shown by Australia. For example, parcels from the Commonwealth could be distributed to the large stores throughout this country, enabling one food parcel to be available each month to every ration book holder. It might be feasible, and it seems a pity that more advantage cannot be taken of the very real desire of those "down under" to do all possible to relieve the monotony of our present diet.

From food shortages it seems natural to turn to dollar shortages—the Australian dollar shortage. Many American firms who might otherwise lose their Australian markets are making arrangements to manufacture in Australia, or to have their particular products manufactured there under licence. Mr. Curphey has, in the course of his tour, advised many firms in this connexion, and it is understood that a number of British firms, in order to hold what market they have in Australia, are putting this scheme into practice.

"America is the most progressive industrial nation," says Mr. Curphey. "The reason—the almost universal acceptance of the incentive system of payment in industry. If that is how it is done, what are we waiting for?"

Argentina's Oil and Fat Policy

In announcing a provisional forecast of the Argentine maize crop, President Peron recently intimated that, "if industrialised, maize could feed pigs, and this would not leave much for export." Probably he was similarly thinking of other livestock, including poultry; but its effect on the bacon and animal fat situation should not be overlooked.

Yet, whatever the exact implication of the statement, any scheme of the kind could not be put into execution forthwith, as the number of swine immediately available would be inadequate. Secondly, the procedure would involve the construction of fully mechanised bacon factories as well as greatly extended rural accommodation for the pigs themselves.

It would be impossible, therefore, to cope with anything like the current season's new maize harvest, now tentatively estimated at approximately 7,000,000 metric tons. Incidentally, under the Anglo-Argentine pact, Britain takes (in addition to fats) 1,272,000 metric tons of maize; but it should be noted that in 1938 our total maize imports were nearly 3,000,000 tons, and considerably more in some previous years.

If Argentina is resolved to convert grain, so far as possible, into livestock, it would undoubtedly entail a big increase in bacon production, and consequently of lard; perhaps also of tallow and other cattle fats. Nevertheless, there would be the necessity, too, of exporting the vastly augmented surplus of bacon; and this might present serious difficulties, as maize produces soft, yellow fat, which is none too popular in British dietary. On the other hand, at one time we did import large quantities of maize-fed bacon from U.S.A.; therefore, if cheap enough, the Argentine product might likewise find a market in this country, although it would have to meet with competition from sources which provide an acceptable quality.

This applies equally to oilseeds, which are now being extensively processed in Argentina. Notwithstanding the current exceptional demand, even linseed oil recently accumulated to a small

extent. Moreover, an extremely abundant crop of sunflower seed is being harvested. If the major portion is to be processed locally, the crushing mills will be forced to work at extra high pressure, and both oil and cake will have to be sold mostly outside Argentina. The recent trade agreement mentions only 100,000 tons of oil-cake and meals of all kinds for Great Britain.

Then, besides the foregoing, various other vegetable oils are produced. These consist chiefly of cottonseed, groundnut, olive, castor, jinjilli or sesame, maize, and rapeseed oils. Tung oil, though highly lucrative, is in small volume at present; but there has been a great advance in olive oil. The number of factories has increased rapidly since 1940, while there are now more than 5,000,000 olive trees, and others are being continually planted.

After treatment, practically all the above commodities furnish a liberal residuum of feeding cake, which must either be consumed locally at a profit, or else find paying markets elsewhere, if the oil and other refined products are to be competitive.

Meanwhile, however, though great reliance is placed on the extensive, rich grazing of the pampas, there is also a local demand for concentrates, especially when pasturage is curtailed by droughty conditions, though ultimate results are dictated by economic factors. Yet, on balance, the policy does seem to indicate enhanced Argentine exports of animal by-products, which might amount in the fairly near future to 50 per cent. more lard, and an extra 25 per cent. of other edible fats, together with industrial grease. This might not be unwelcome, as U.S.A. seems to have partly dropped out as a world seller of oils and fats, for the time being at any rate.

Insecticide Residues in Canned Foods

The discovery of the insecticidal properties of DDT and other new organic insecticides marks a major advancement in the food processing industry, but the finished product is a problem demanding serious consideration. Frank C. Lamb, at the 1948 Annual Food Processors' Conference held at the University of California, described some experiments which emphasised this.

Canned spinach was prepared from spinach which had been dusted in the field with several different insecticides. Of these insecticides, benzene hexachloride ("BHC" or "666") gave an undesirable, easily detected off-flavour to all the samples treated with this material. Thoroughness of the washing treatment had no effect in reducing the off-flavour. Nicotine, hexaethyl tetraphosphate, and DDT showed no effect.

The off-flavour could also be detected both in fresh and canned tomatoes, and carrots grown on soil treated with BHC, even when the rate of application was as low as one pound of gamma isomer per acre.

It is believed possible that the off-flavours observed in samples treated with BHC may have been due to non-active isomers or other impurities in the commercial preparations, and that further purification may produce an insecticide which will not give rise to off-flavours. It is suggested, however, that no large commercial application of this insecticide be made pending further research into this problem.

The Dye-Hards

The situation arising from the action of American agricultural interests determined to maintain butter sales in the States by restricting the margarine market seems strange reading to the rationed people in Britain. American margarine with an attractive yellow dye is dutiable; any natural yellow tint present must be bleached before sale of the commodity. If a grocer wishes to add artificial colouring to the almost white stock, he must pay tax to the tune of 400 dollars a year. And now, according to the Washington correspondent of *The Times*, latest move from the dye-hards is the announcement that since the American Red Cross has suggested margarine for butter to those housewives out to economise in their households, the American dairy industry has ceased subscribing to the Red Cross.

Over here quite a number of people receiving food parcels from American friends have been titillated whenever a package containing margarine is included. Wrapped in the toughest of Cellophane, the margarine has to be kneaded before opening, this after first releasing the colouring agent from its cachet—to yield a brightly tinted product which might as well have been coloured in processing. Though the necessity seems curious to the British housewife, one striking point in which United States food manufacturers get full marks is the rapidity and ease of distribution of the dye throughout the mass. The remarkable homogeneous appearance of the kneaded mass, and resistance of Cellophane to bursting during the housewife's vigorous execution of directions for mixing, surpass all expectations.

The Fishery Industries of North America

PART III.—CANNING

DR. J. A. LOVERN,
Torry Research Station (Department of Scientific and Industrial Research)

The first part of this series of articles dealt with the handling and freezing of fresh fish. Part II described the salting, drying, and packaging of cod. The canning of salmon, tuna, pilchards, herring, and other products is discussed in this third instalment.

THE canning of fish is important in all the areas covered, but especially so on the Pacific coast.

Salmon Canning

Salmon is canned on a very large scale on the Pacific coast of Canada and to a lesser extent in the northerly areas of the U.S. Pacific coast, the main U.S. production being in Alaska rather than U.S.A. itself. Operations in a typical large Canadian factory are as follows.

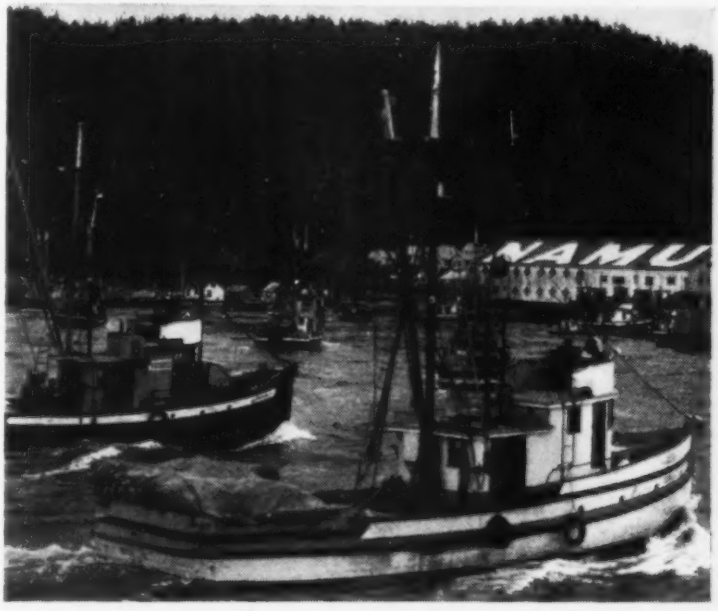
Five species of salmon are canned, the fish being sorted into the several species in the boats which deliver them at the canneries. These boats are usually what are known as "packers," which bring the fish in from collecting stations at various points on the coast. The fish are unloaded via an elevator into the factory, and then flumed to temporary storage bins. From these bins they are flumed to the operators who pass them through the "iron chinks," machines for gutting and dressing the fish, removing head, tail, fins, etc. The offal from this operation is flumed continuously into the adjoining reduction plant, for conversion into meal and oil. The dressed salmon are flumed to women who rub off slime and some scales, and who also remove any ragged bits left by the "iron chink." Automatic brushing machines, for removal of slime, have been found to be too rough in action and to damage the fish. The "iron chink" is adjustable to deal with different sizes of fish.

Treating the Dressed Fish

The dressed fish are next built up by hand into a continuous roll on the feeding conveyor of the can-filling machines. This roll, of roughly constant diameter, is formed by tucking the tail end of each fish into the belly cavity of the preceding fish. As the roll passes through the machine, it is cut into steaks of the same thickness as the can depth, which are pressed into the cans by pistons. This operation is very messy, and there is a considerable overflow of salmon fragments, which are washed off on to the floor by a stream of water. Salt is added automatically, and the cans then pass over weighing machines to vacuum closing machines and so to the washers and the retorts. The processing time for salmon is not very critical, and the processed cans are allowed to cool in stacks on the cannery floor.

Packing of Tuna

As with salmon, several species of tuna are packed. The most valuable is the white-fleshed albacore, which forms an important part of the landings at Astoria, Ore. The biggest tuna canning operations are in Southern California, particu-



Part of British Columbia's salmon-fishing fleet heads towards the wharfs and barges to unload its cargo.

The seining vessels unload the day's catch into cannery fish barges, where it is iced down before delivery to the canneries.

larly at San Diego whence the famous tuna clippers sail as far as South America for their catches. These boats bring back the tuna in frozen form, held in wells in which they are first frozen by direct immersion in refrigerated brine, which is then pumped out, leaving the well refrigerated by means of coils.

A large tuna clipper can bring back up to 400 tons of fish on one trip, the species including blue fin, yellow tail, skipjack, and bonito. There are legal size limits for the larger species, namely a minimum of 10 lb. and a maximum of 150 lb., the latter being imposed by the canners. The fish aboard the clippers are partially thawed by pumping sea water into the wells twenty-four hours or so before unloading—either on the return voyage or in port if it is learned by radio that there will be delay in unloading. If soft enough when unloaded, the fish go directly to the gutting tables, otherwise they are conveyed to tanks of circulating sea water until ready for gutting.

The tuna are first gutted, washed, and scrubbed by a team of workers on the conveyor line principle, with each operator concentrating on one job. The cleaned fish are loaded into metal mesh baskets, which are then conveyed on trucks into retorts, in which cooking is carried out at 2 to 3 lb. per sq. in. pressure for periods depending on the size of the fish and ranging from one hour up to seven hours or more. The trucks are then wheeled out into the shed and allowed to cool. A considerable amount of oil runs out during this cooking operation, and is recovered from the floor of the retort. A common practice, especially with large fish, is to cook the fish the day before they are to be packed and then, if desired, just warm them before packing to loosen the skin.

From the baskets the fish are fed to a trimming line, where heads are removed, the skin rubbed off, the fish quartered longitudinally, the backbone removed, and lastly the dark meat along the lateral line removed. All this offal is sent to the reduction plant, but with the more valuable species, such as albacore, the bits of white meat rubbed off with the skin are recovered by hand picking for packing in flake form.

Two types of pack are prepared—solid pack, containing large pieces of meat, *e.g.* not more than three to a 7 oz. can, and flake tuna. The former is the higher priced product, and as much as possible of the more valuable species is packed in this form.

The usual method of preparing a solid pack is for the fish quarters to be passed through a machine which cuts them into steaks of the same thickness as the can depth. These are then broken by hand and packed manually into the cans. At Astoria, Ore., however, there are machines which pack the pieces automatically, and select from all the assortment offered groups of three pieces, each group having the right weight. This machine, known as the "Pak-C-Lector," has been fully described in *Food Industries*, 1946, **18**, 527.

For the preparation of flake tuna, the fish quarters or the salvaged fragments are fed to flaking machines incorporating beaters and screens. The filling machine then presses a definite volume of fish into each can. All cans, both solid and flake pack, are then automatically dosed with soybean oil and salt before sealing, washing, and retorting.

California Sardines (Pilchards)

Called sardines in U.S.A., but imported into Great Britain under the name "pilchards," these fish are caught in both Canadian and U.S. waters, but only canned in California. Elsewhere, as also to a large extent in California, they are caught for

conversion into oil and meal. Californian state legislation, with the object of ensuring conservation by limiting reduction operations, requires the production of a certain number of cases of canned sardines from each ton of fish reaching a factory holding both a canning licence and a reduction licence. The reduction operations are the more profitable, and if it were not for this law it is doubtful if any of this fish would be canned.

At the cannery, the fish are "brailed" with a dip net from the flooded holds of the boats into the hopper of an elevator conveyor, which takes the fish to the top of the factory buildings. This conveyor is made of metal mesh to allow the fish to drain, and the drainage liquor runs to concrete tanks from which some oil is recovered, and also scales and other debris which are sent to the reduction plant. At the top of the conveyor the fish pass through a weighing device, and are then conveyed, as desired, either into the cannery or into the reduction plant which always adjoins it.

The empty cans (top right) enter a rotary filler, are automatically filled, and leave the machine on a conveyor belt which carries them past the inspectors.

After cleaning, canning, and sealing, the canned salmon is wheeled on trays into a retort, where it is cooked for ninety minutes at 259° F.

In the cannery the immediate treatment of the fish depends on the supply position. If possible, fish pass directly to the processing lines, but otherwise they are placed in buffer storage tanks from which they are released as fast as the factory can handle them. In these tanks they are kept in sea water or in artificial brine of about 5 per cent. salt content, at temperatures ranging from 32° F. up to 50° F., depending on the time the fish are to be kept. Even if storage is only for a few hours, and no refrigeration is necessary, the fish are kept in sea water to minimise damage by crushing. As a general rule storage is not likely to exceed twenty-four hours.

According to the appearance of the fish and the pack desired, the

Herring churning in a huge net as it is drawn tight into a " purse."

fish may or may not be scaled in machines similar to those described in Part I of this series. Many scales are removed by rubbing on the boats and conveyors, and scaling at the cannery is not always necessary. Certain types of heading and gutting machines, however, will only work satisfactorily on properly scaled fish and, where such machines are in use, factory scaling is essential. Certain types of gutting machine, moreover, will only work satisfactorily on fish of uniform size, so that a size grader must be incorporated in the processing line. This is not found in canneries employing some other types of heading and gutting machines.

There are numerous types of such machines in use. A very common one incorporates a conveyor belt fitted with wooden grooves into each of which a fish is placed by hand, belly downwards. The belt passes under two rotating disc knives, one of which cuts off the tail and the other partially severs the head. As the belt travels on, a plough pulls off the head and with it most of the viscera. In another type the head is completely severed, and the fish then gripped by a clamp. A suction nozzle next automatically sucks out the viscera, after which the same nozzle washes out the bellies with hot water. On another model the fish are carried in a rotating cutter instead of a conveyor belt, again employing suction to remove the viscera. A new type of machine injects steam between the suction stage and the hot water stage, and it is claimed that this process removes the black skin lining the belly cavity, as well as viscera not removed by suction. Still another type of machine uses an auger eviscerator together with a water jet.

The fish may be canned either in tall cans (four fish to a can, two head up, two tail up) or in flat ovals. The cans are filled by hand and then sent on a conveyor through some form or other of exhaust box in which they are cooked with open steam at atmospheric pressure for about twenty-two minutes. In Northern California the fish have a higher seasonal oil content than in Southern California, and in the north surplus oil is always removed from the cans after exhausting, but this is not done in the south. The most usual practice is to invert the cans automatically as they leave the exhaust box, but sometimes the tall cans are flushed out twice with water. Salt, or tomato sauce plus salt, is then added. Alternatively, with the tall cans, the flushing operation may be done with brine of the right strength. The contents of the tall cans, which have been flooded, are tamped down before sealing.

Herring (Sardines)

Small herrings are canned in New Brunswick, in Maine, and to a lesser extent elsewhere on the Atlantic coast under the name " sardines." The Pacific herring, closely related to the Atlantic species, was canned in Canada during the war to meet the shortage of canned fish in Great Britain, but this practice has been discontinued.

Two principal types of pack are prepared from smoked and unsmoked fish respectively. The " sardines " are caught in weirs or in stop seines, where they are kept imprisoned and brought to the canneries as required. The boats which bring them are fitted with water-tight holds having a false floor, and the fish are packed in these holds with salt. Several hours' salting is necessary before

further processing and, if there has been insufficient time on the boat, the fish are held with more salt in concrete tanks at the cannery.

Fish are unloaded from the boats either by a hoist and basket or by mixing with sea water and pumping out of the boat. In either case they are then flumed with sea water to temporary storage in concrete pits. On the way they pass either over metal gratings or through a conventional wire mesh scaler, to remove most of the remaining scales. Many of the scales are rubbed off in the boats and are recovered from the false floors. These scales are a valuable by-product, and are used in the manufacture of pearl essence and of foaming agents for fire-foam extinguishers.

The fish are next loaded on to wire mesh trays passing on a conveyor beneath a filling machine, and are then spread fairly evenly by hand. The succeeding operations vary in different factories. Thus, in one process, the trays are placed on trucks which are wheeled into open steam-cooking chambers, and the fish given a cook of about eleven minutes at 9 lb. steam pressure. The trucks are then wheeled into a drying tunnel through which hot air is blown. There is no recirculation in this tunnel. When the fish are almost dry enough, *i.e.* firm enough, for canning, the trucks are transferred to a cold air tunnel where advantage is taken of the remaining heat in the fish to complete the drying process. In another process the trays of fish pass through a continuous cooker consisting of banks of closed steam coils above and below the conveyor belt, supplied with steam at 100 lb. pressure (300° F.). This cooking section of the conveyor system is enclosed in a box, into which a little live steam is admitted to maintain a high humidity and so prevent excessive desiccation. Cooking time is five minutes. The belt then conveys the fish through a hot air drying tunnel, the actual drying conditions being varied according to the condition of the fish, *e.g.* how long it has been kept in salt.

When fish are to be smoked as well as dried, the two operations are usually combined in one tunnel, employing partial recirculation. The tunnel may or may not also incorporate a continuous cooker. Trays of fish coming hot from such a tunnel are often placed on trucks and wheeled into a cold air tunnel for a final drying, making use of the residual heat.

At the packing line girls remove heads and tails with scissors and pack the fish by hand into the usual flat sardine cans, which are subsequently dosed with soybean oil or cottonseed oil, sealed, and processed. The product is not considered a quality one, and the emphasis during packing is on speed rather than care, a fair proportion of the fish being damaged during this operation.

Kipper Snacks

Larger herrings are sometimes canned on the Atlantic coast as kipper snacks. In one process the herrings are salted in concrete tanks in the same way as the small herring canned as sardines. They are then split into fillets by machine, and the fillets cooked, smoked, and dried in a continuous tunnel in about thirty-seven minutes. In another process the fish are machine-filleted before salting, the fillets brined and spread on wire mesh trays in a chamber heated to about 220° F. by means of steam coils until cooked. They are then smoked in a kiln of conventional design. Kippers darken appreciably on canning, so for this purpose are less heavily smoked than are ordinary kippers, and there is no use of dye. No sauce is added. The

The "brailer" or scoop net, guided by a man at the end of the pole, lifts two tons of herring at a time from the net still in the water.

fillets are either packed in long flat cans or are cut in half with scissors and packed into sardine cans.

Other Products

Other canned fish produced on the Atlantic seaboard include mackerel fillets, cod flakes, and ready-to-fry fish cakes. The mackerel are filleted mechanically, leaving the rib bones in the fillets, which are packed in oval cans with a little salt. For the cod flakes, fresh cod are steamed and the flakes picked off by hand. No condiments or sauces are added. For the fish cakes, the cooked cod (obtained from salt cod as described in Part II of this series) is minced and mixed with extruded potato from a special machine, which is fed with peeled and cooked potatoes and which automatically retains the eyes and any pieces of skin. Measured amounts of liquid shortening and pepper are added by hand during the mixing, and the product is then canned.

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Photos courtesy The Canadian National Film Board.

(To be continued)

The Groundnuts Scheme

PROGRESS in the East African Groundnuts Scheme has not been so rapid as was originally estimated. According to the recently published White Paper* only 8,000 to 10,000 acres have been planted during the year ended November, 1947, instead of the estimated 150,000 acres. The late arrival of clearing tractors and the weeks of experiments with modifications of equipment to devise methods of up-rooting the extensive, tough, and pliable thorn roots and the multiplicity of tree stumps are blamed for this low figure, while, on the credit side, the experience gained and the organisation and stores which have been built up promise speedier progress in the future.

Labour shortages have provided a further problem, and efforts to overcome this have resulted in the expansion of training facilities for Africans.

A scientific research and control unit, under a Chief Scientific Officer, and including a chemist, a soil chemist, an agronomist, an entomologist, and a geologist, are undertaking experiments in crop rotation, the use of fertiliser, and seed selection, and are initiating schemes for the local production of vegetables and livestock products for consumption by personnel employed on the scheme. Seven small trial plots in the Kongwa area planted with groundnuts in January, 1947, produced an average yield of decorticated groundnuts of over 900 lb. per acre, even though some of the soils were of low fertility. The yield on the most fertile plots was 1,580 lb. per acre.

The total net expenditure on the scheme up to November 30, 1947, was £4,250,000. This expenditure has been almost entirely on capital equipment, a large part representing the cost of mechanical equipment for clearing and agricultural purposes. It is already clear that both the costs and revenues of the scheme are likely to be considerably in excess of the original estimates, but the report considers that for the present no useful purpose would be served in attempting to revise these figures.

* *East African Groundnuts Scheme.* Cmd. 7314. H.M.S.O. Price 3d. net.

Dehydrated Vegetables

IN a paper by M. F. Mallette, in collaboration with W. L. Nelson and W. A. Grotner (*Industrial and Engineering Chemistry*, **39**, 10, 1345), evidence is presented to indicate that a relatively high oxidative enzyme activity in dehydrated cabbage does not influence the rate of deterioration of the stored material as measured by colour, odour, and ascorbic acid changes. However, the type of blanch employed is important to the storage life of dehydrated cabbage. Of the treatments employed, a thirty-second dip at room temperature in 0·5 per cent. sodium bisulphite solution resulted in the longest storage life for the dehydrated vegetable at both 75° F. and 100° F. Retention of ascorbic acid in this sample was good at 75° F., and better than in any other sample at 100° F.

Cabbage samples dehydrated without any prior blanching treatment, and with a four-minute steam blanch, were both fairly good after storage, whereas the hot sulphite and the one-minute steam blanches led to products that were less stable on storage. The high moisture content of these samples probably influenced the storage stability.

A rough correlation was again observed between the ascorbic acid content of all cabbage samples and storage deterioration, as evidenced by the qualitative record of colour and odour. The extent of deterioration increased with increase in storage time and storage temperature. No correlation was found between the storage characteristics of the samples and their oxidative enzyme content; this confirmed a previous observation.

It may be that some type of blanching must be employed prior to dehydration to prevent changes in texture and other factors affecting acceptability which were not measured in this experiment. For instance, the untreated controls were bleached and appeared to be tough in texture. However, these data again indicate the possible adverse effects of using a too severe blanching treatment.

The Baking Industry

Progress in 1947

S. WALTER BUTTERWORTH, B.Sc.,(Tech.), F.R.I.C.
Birkett and Bostock, Ltd.

THE word "progress" has a philosophic content that has to be examined carefully before embarking on any review of the activities of the baking industry during 1947 or, indeed, any other year. The S.O.E.D. defines progress as "the action of stepping forward or onward . . . the course of events . . . development (usually in a good sense) . . . continuous improvement." Whether the affairs of the industry have shown "continuous improvement" during 1947 is a matter of some doubt. Decreased allocations of basic raw materials, increasing overhead costs, the continuance of rationing, long delays in the replacement of overworked machinery—these are difficult to regard as factors indicating improvement, continuous or otherwise.

On the other hand an encouraging trickle of raw materials, not seen in most bakeries for many years, has begun to flow; cherries, almonds, and peel are beginning to improve the palatability of a small percentage of the flour confections now being made; the National Board for Bakery Education has successfully launched its ambitious scholarship scheme; bakery workpeople are on an improved wage basis; and the number of bakers in the bankruptcy court is not unduly large. Were it possible to strike a true balance in measurable units, the baking industry could be said to have been "stepping forward or onward" and "developing (in a good sense)" in 1947.

Research Progress

One of the outstanding signs of progress has been the establishment during the year of the British Baking Industries Research Association. For many years it has been realised that the lack of such an organisation has been a handicap to bakery firms both large and small. The fact that the Research Station at Chorley Wood has made such progress during the past twelve months is largely due to the efforts of a well-balanced and representative Research Council under the chairmanship of Dr. R. T. Colgate and the energy and ability displayed by the Director of Research, Dr. J. B. M. Coppock. The Association is supported by progressive firms in all branches of the industry—breadmaking, biscuit manufacture, and flour confectionery—and its library and publications department began some months ago to publish bulletins, reports, and abstracts for the benefit of members. The steps already taken in team building and equipment of laboratories and test bakery, as well as the help given to subscribers in dealing with their own bakery problems, give every hope that the B.B.I.R.A. will play a leading part in the affairs of the industry in future years. In addition to its purely research activities, the research station is in close contact with other similar organisations functioning under the aegis of the D.S.I.R., thus ensuring a proper representation of the baking industry in matters affecting its interests. A channel of this kind for making available to the industry technical data otherwise difficult of access has long been needed.

Technical Training

During 1947 the National Board for Bakery Education was inaugurated to co-ordinate the educational activities of many trade organisations. One of its early activities, as has been mentioned, was to set up machinery for the award of scholarships, each of the value of £150 per annum, tenable in full-time bakery schools. Ten such awards were made during the year under review. Forty-two applicants were examined, and eighteen were selected for final interview before the ten scholarships were awarded.

Another important activity of the National Board has been the drafting of regulations governing the award of a Higher National Diploma in bakery subjects having the approval of the Ministry of Education. It is unfortunate that lack of accommodation at present greatly limits the number of schools at which the Higher Diploma course may be held. The promises concerning improved facilities for technical education are taking a long time to put into practice—the delay is understandable but none the less exasperating to those who have the dismal duty of turning away keen students by reason of the shortage of space, equipment, and trained staff. In addition to its work on the Higher Diploma, the National Board is also giving attention to greater uniformity in the operation of the Diploma scheme originated by the National Association of Master Bakers. In the year under review, provision was made for substantial alterations in the structure and requirements of the City and Guilds of London Institute examination scheme. The separate examinations in breadmaking and flour confectionery at the intermediate stage have been replaced by a conjoint intermediate certificate in both subjects. Ancillary science subjects are no longer required at this stage. For final certification the Institute is now holding its own examinations in bakery science instead of accepting the results of local examinations as heretofore.

The requirements for the full technological certificates in breadmaking and in flour confectionery have now been made more comprehensive, and the whole scheme is now graded more clearly into its three main stages.

Bakery Literature

The subject of the contamination of bakery raw materials and baked products has received much consideration, and papers on this topic have been published by Walker[1] and by Buckley and Whinery.[2] A paper was also read to the Society of Public Analysts and Other Analytical Chemists by Kent-Jones *et al.*, in which an analytical procedure for the detection and estimation of rodent hairs and excreta, insect fragments and the like was described. The hysteria of dogs brought about by excessive doses of nitrogen trichloride-treated flour, first observed by Mellanby,[3] has been the subject of several communications including that of Moran,[4] Newell,[5] and other workers. There is no evidence to date that "Agene" treated flour has any effect on *homo sapiens*, but it is clear that the subject is of sufficient importance to justify the intensive investigations now in progress. In this connexion the Minister of Food stated in the House of Commons in reply to a question that "the proportion of flour which has been treated with Agene is approximately 90 per cent. This substance has been used by millers as an improver for more than twenty years, and there is no evidence to show that it is harmful to human beings. My Department is studying the implications of the work recently published showing its effect on dogs."

Bread staling has again been commented upon, and two American authors, Favour and Johnston,[6] have indicated that polyoxyethylene stearate exercises a retarding effect on the rate of staling of bread crumb. Olcott and Mecham[7] have reported an interesting piece of work on the formation of a protein lipid complex during dough mixing, and Zeleny[8] has described a rapid lactic acid sedimentation test that may give useful results in estimating the gluten value of breadmaking flours.

Alpha and Beta Amylase

The effects in breadmaking of alpha and beta amylase have received further attention. Selman and Sumner[9] have compared the results given by the amylograph with those obtained from gassing tests and maltose tests, and Cunliffe,[10] in a paper on dextrins in yeast-raised bread, has examined the possible relationships between dextrin figure and crumb stickiness. It remains true, however, that there is no known practicable method of overcoming the effects of excessive alpha amylase activity in breadmaking flours, and this problem is one that still offers ample scope for further work.

A word of thanks to J. A. Anderson[11] and his collaborators for their book on enzymes and their role in wheat technology is not out of place. This authoritative publication gathers together between its covers the sort of information on enzymes that would otherwise involve hours of work looking through the literature. An even greater debt is owed by the baker and the cereal chemist to Kent-Jones and Amos[12] for the new edition of their book on cereal chemistry. This standard work has been extensively reviewed, and although it has been criticised for attempting to cover too much ground it often turns up trumps when other works of reference fail.

In this brief review of publications, reference must be made to the work of Whymper and Bradley[13] on the viability of wheat seeds. Although, as they state in their paper, the idea of the germination of Egyptian mummy wheat has long been discredited, the effort of the authors in their tests on the germination of English wheat extending over a period of more than thirty years is a model of patient long-term investigation.

Another step of some interest to bakers is the publication of section J of the American *Biological Abstracts*, in which cereals and cereal products are dealt with under the editorial direction of the American Association of Cereal Chemists and the American Millers' National Federation. Since this is a new publication, it remains to be seen whether the overlapping of existing abstracts has been avoided.

Breadmaking and its Problems

Bread continued to be rationed during the year under review, although there is much evidence that many of the provisions of the rationing order were not strictly adhered to by some bakers. The amount of clerical work thrust upon their more conscientious brethren by rationing is a load that could very well be shed. The sooner it is found expedient to dispense with this form of control the better. Perhaps the improving cereal position will enable this to be done in the not-too-distant future. Another easing of the bread baker's burden would result from a reduction in the flour extraction rate from the 1947 85 per cent. level to 80 per cent. or lower. It will be recalled that the report of the Post-war Loaf Committee—the subject of much trenchant criticism of late by Dr. Kent-Jones and others—made reference mainly to bread from 80 per cent. extraction flours. There is no doubt that at such an extraction level it would be much easier to produce regularly a more palatable loaf and one approved in its nutritional qualities by the medical representatives on the P.W.L. Committee. Little progress appears to have been made in dealing with the recommendations of the P.W.L. Committee, although such evidence as is available would appear to support an extension of the limited enrichment policy (if so it can be called) at present exemplified by the continued addition of 14 oz. of prepared

chalk to each sack of flour milled in this country. The failure of the Canada Approved Flour Scheme in the Dominion and the success of the fortification scheme in America seem to point the way not only to a decreased rate of extraction here but also to the accompanying increase in animal feedingstuffs so ably advocated by Dr. Norman Wright. Dr. Wright's paper on "Wheatmeal Bread or Milk,"[14] although published in 1941 and based upon conditions then prevailing, contains arguments that still carry considerable weight. It is the business of the baker to produce the most palatable, attractive, and nutritious loaf, but his attempts to do so are limited by the materials available to him. It is perhaps unfortunate that arguments concerning flour extraction rate, fortification by chalk and vitamins and the like have tended to obscure the possibilities of improving bread quality by the addition of such commodities as fat and milk products. We are aware that such additions may be regarded as impracticable at this time, but there is a real danger of their value to the bread baker being overlooked in this country. In America, of course, fat is used as a major ingredient in the breadmaking process. The beneficial effects of fats in improving bread from our longer extraction flours is well established, and it is hardly too much to say that the more liberal use of fat in bread would reduce the need for flour treatment by the miller.

Milling Grists

During 1947, as for many years before, the mainstay of all British milling grists has been Canadian wheat, and the quality of the flour produced has depended in the main on the ability of the Canadian to carry wheats of inferior gluten value and on the ability of the miller to deal effectively with the wheats allocated to him. English, a little Australian, Plate, Durum, and some American, have in varying proportion contributed up to 50 per cent. of the grists. The hot harvest weather in Great Britain in 1947 produced English wheat of above average milling quality, and during the later part of the year this led to some uneasiness concerning the adequacy or otherwise of the gassing power of flours. Malt flour was added by some millers to remedy a defect in many cases more fancied than real—the baker can deal fairly easily with lack of gassing power, but, as has been mentioned earlier, he can do little to correct excessive zeal in the use of malt flour.

On the whole millers did a good job with the wheats available at the length of extraction they were compelled to maintain.

Before leaving this subject another tribute must be paid, this time to the Dominion of Canada and the farmers of the prairie provinces in particular, without whose continued loyal support and good comradeship the food situation in this country during 1947 would have been grave indeed. There has been some small argument as to whether the levels of the Canadian wheat grades have been fully maintained of late—certainly the Canadians did their utmost to maintain them, and it is a fact too often forgotten that our friends in Canada continue to supply us with the world's best breadmaking wheats at the world's lowest price.

Although flour is the raw material used in the greatest quantity in breadmaking, it is yeast that makes the dough rise, and perhaps the fact that little is published in bakery journals concerning the behaviour of our particular type of *Saccharomyces* is the best compliment that can be paid to the regular and consistent gassing brought about by most yeast consignments. Some labour trouble in the North caused a temporary dislocation of yeast supplies during the year, and many bakeries had to turn to war-time emergency breadmaking routines. Such a break in normal production methods proved to be a useful reminder that present flours can withstand fairly prolonged fermentation processes satisfactorily, and that a long process can contribute to crumb softness, keeping quality, and bread flavour.

The "Rope" Problem

The hot summer of 1947 made the rope problem more acute than usual, but judging by the limited number of complaints most bakers would appear to have taken advantage of one or other of the well-known methods of rope prevention. Although it is now fully realised that conditions of dough acidity and bread storage govern the outbreak of rope to a considerable extent, yet there have been several clear indications that flours with a very high rope spore count can give rise to real trouble even under conditions where more normal flours would show no sign of rope development. Some trouble, too, has been caused by deliveries of musty flour—a taint that persists in dough and baked bread. The changes in the Bread Order in 1947 caused some controversy. The clause restricting bread shapes was eliminated, and there were many who protested against the removal of this form of control on the grounds that increased labour costs would be incurred by those bakers who took advantage of the change. The introduction of a silicone derivative by Dow Corning in America for the treatment of bread tins to replace tin greasing has received considerable attention in this country, and the results so far achieved appear to be encouraging.

Flour Confectionery

At a time when austere flour confectionery was of necessity the order of the day with decreased supplies of basic raw materials in circulation, the marriage of Princess Elizabeth and the Duke of Edinburgh provided a bright spot, and interest was aroused by the wedding cakes made. The occasion provided an opportunity for a display of craftsman-

ship almost forgotten since the days of the Bakers' Exhibition last held in 1938 in the Agricultural Hall, Islington. The cakes made by several eminent firms showed a wide range of designs varying from the highly ornamented to the more severe approach that was gaining favour before the war. Although a few confectionery competitions were held in 1947 and the bakery students societies' demonstrations gave young craftsmen some opportunity of gaining a fleeting glimpse of first-class flour confectionery, the industry had little chance of satisfying its customers with anything approaching the pre-war variety of confectionery lines. The flour confectioner was still on the horns of a dilemma. If he enriched his products even to the limited extent that prices and materials permitted, he had to reduce the amount of confectionery manufactured. By so doing he pleased a few customers but disappointed many. To strike a fair balance between lean and richer goods was, and is, an ever-present problem.

In an attempt to resolve this difficulty, numbers of alleged substitutes for such basic materials as fat, sugar, and egg were marketed by some allied traders whose zeal in this matter was somewhat misguided since few of these products made any real contribution towards the manufacture of good confectionery. Fortunately, an increasing number of bakers realise that the claims made on behalf of these substitutes need to be examined with care before any confidence can be placed in them. On the equipment side of the industry the results of the use of high-frequency heating gear on various baked products has aroused much interest, and the idea of baking in a matter of seconds or a few minutes is one that is bound to appeal to the imagination of the progressive baker. It is too often forgotten that the "baker" is named by virtue of the kind of heat treatment he uses to manufacture his product.

Modern Developments

The results achieved by high-frequency baking are striking because they are so different from those produced by the normal baking process. The condensation of moisture on the cold metal parts of the gear, while the thermometer in the goods indicating central crumb temperature rises rapidly towards boiling point, is the sort of thing that must appeal to the curiosity of the most hard-boiled—or hard-baked—observer. There are a good many obstacles to be overcome before H.F. baking can become a widely used commercial technique, but the process has already several practical possibilities in the baking industry.

From heating to freezing is an easy step, and here again many developments of interest have taken place during the year. Although frozen fruits, *purées*, and foods at present concern caterers more closely than bakers, some of these products have useful baking applications. The work on frozen doughs has gone on more in America than in this country, and the subject has given rise to a wide divergence of views as to the value of the results. A useful summary of the advantages and disadvantages has been given by W. E. Broeg.[18]

In attempting a survey of the activities of the industry during 1947, there is an inevitable feeling that the items dealt with are some of those that have appealed to the reviewer rather than those that have really affected the work of bakers during the year. The main job of providing over forty-five million people with bread, biscuits, and flour confectionery was carried on through the difficult spring of 1947 by the strenuous efforts of vanmen and transport staff generally, while the man in the bakery kept production going with limited materials and overworked machinery. The men whose business it is to organise and administer these services kept the wheels turning even if at times the machinery creaked a little. Although this review has dealt mainly with *things*, it is not forgotten that the goods are made and delivered by *men* (and women, too) working as a team in a trade that has many drawbacks and yet is one that remains as fascinating an occupation today as it has been for centuries.

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[3] Mellanby, *Food Manufacture*, **22**, 1947, p. 217.
[4] Moran, *Lancet*, 1947, p. 289.
[5] Newell *et al.*, *J. Amer. Med. Assn.*, 1947, p. 763.
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[7] Olcott and Mecham, *Cereal Chemistry*, **24**, p. 407.
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[9] Selman and Sumner, *Cereal Chemistry*, **24**, p. 291.
[10] Cunliffe, *J.S.C.I.*, **66**, p. 187.
[11] Anderson, J. A., and collaborators, *Enzymes and their Role in Wheat Technology*.
[12] Kent-Jones and Amos, *Modern Cereal Chemistry*.
[13] Whymper and Bradley, *Cereal Chemistry*, **24**, p. 228.
[14] Wright, *Chem. and Industry*, 1941, p. 623.
[15] Broeg, *Bakers' Helper*, October 4, 1947, p. 72.

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.*

And to Drink, Sir! By Martin H. Perry. Pp. 72. London. Price 7s. 6d. net.

Hormones and Vitamins. By G. A. Stephens, M.P.S. Pp. 315+xii. London. Price 21s. net.

Milk and Dairy Products. By Lincoln M. Lampert. Pp. 291+v. New York and London. Price 36s. net.

Aluminium in the Food Industry

THE importance of aluminium in the food industry has increased steadily over many years, and it is now used extensively for plant, equipment, containers, and wrapping materials. In planning further research with a view to extending the usefulness of the metal, the Low Temperature Research Station, D.S.I.R., has carried out a thorough survey of all the available information relating to the properties of aluminium and its alloys which might conceivably affect their corrodibility. This information, which was highly scattered and uncoordinated, is now available for the first time in a single comprehensive and critical report.*

Aluminium possesses many desirable qualities which render it suitable as a material for use in contact with foods and beverages, and it is already well established in certain branches of the food industry, notably in dairying and brewing. The report should be of value to food technicians and to others interested in aluminium generally, the author's own experimental results being woven into the text.

The survey clearly shows that aluminium is inherently a very reactive metal, and that its resistance to corrosion is entirely due to the presence of a highly protective film of oxide on the surface. The protective properties of this film have been considered both in relation to particular conditions at the surface of the metal and to those in the solution with which it may be in contact, for it is known that corrosion can be greatly influenced not only by the structure and composition of the metal at the surface but also by the power of ionised substances in solution to penetrate, undermine, or dissolve the film.

It was necessary to consider the action of simple aqueous solutions, *e.g.* acids, salts, inhibitors, etc., in order to gain an insight into the corrosion by complex substances like foods.

While the factors external to the metal are dealt with in great detail, the special problems relating to the metal itself, *e.g.* those encountered in marine engineering, are outside the scope of the report. There is no evidence that any properties injurious to health are imparted to foods which have been cooked or held in aluminium vessels, and aluminium neither accelerated the destruction of vitamins during cooking nor catalysed the oxidation and rancidity of fats. It also has no affect on yeast fermentation.

The effect of food products on aluminium is considered in great detail, and the practical information on the aluminium can and other aluminium packing materials should be of considerable value to the food industry.

The report is divided into four parts, the first part treating of the metal and the surface film in relation to the different types of corrosion which may develop. The second part gives a detailed account of the corrosion by aqueous solutions, while the third part covers thoroughly the corrosion by different types of food products and beverages. The various methods of protecting aluminium, viz. by oxide coatings, metallic coatings, cathodic protection, paints, and lacquers are discussed in the last part.

* *Food Investigation Special Report No. 50. Aluminium and Aluminium Alloys in the Food Industry.* Pp. 153+v. H.M.S.O. Price 3s. net.

CORRESPONDENCE

Fish Paste Manufacture

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—We must express considerable concern at what seems to be a growing tendency on the part of Food Ministry officials to inform the public that canned fish purchased by government departments and found unsuitable for normal use will be diverted to the manufacture of fish paste.

Last December certain newspapers published a statement, alleged to have been made by "a Bristol Food Official," to the effect that snoek found unfit for distribution would be made into fish paste, animal foods, and dog biscuits. Not long ago, in the House of Commons, in reply to a question regarding snoek, the Food Minister is reported to have said: "We have decided it was too salt. We shall use it for fish paste."

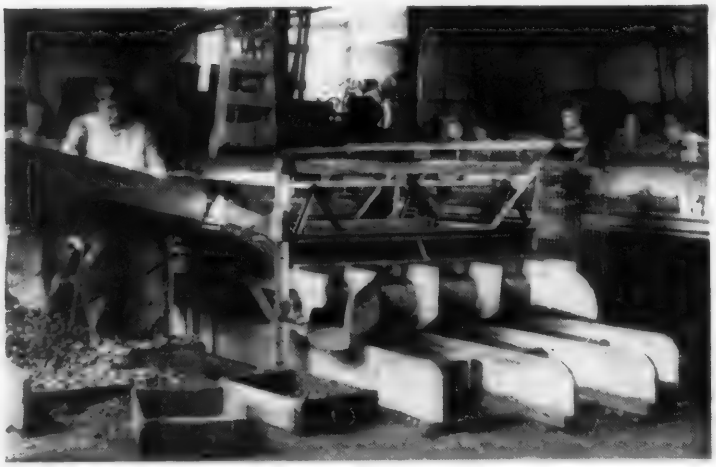
This firm, established in 1760, has not so far had any offer of snoek from the Ministry of Food. If, however, offers are received in due course, we shall find them difficult to accept, as, apart from our own revulsion of feeling following the adverse publicity already given to this fish, we would need a good deal of persuading that the public would buy "Snoek Paste" in the light of the statements quoted above. We imagine that, without attempting to sample the paste, members of the public would probably dismiss it as "unfit," "fit for animals," or "too salt."

We would not ourselves feel disposed to manufacture and market an "un-named variety" of fish paste composed largely of snoek, and we deeply resent the apparent implications by officials to the effect that fish paste may contain low grade, rejected, or undesirable commodities.

The Ministry of Food rightly expects the trade to maintain high standards of quality, and we consider it most disturbing that efforts made in this direction by old-established concerns should be undermined or frustrated in the public mind by seemingly unhelpful and unqualified comments on the part of officials.

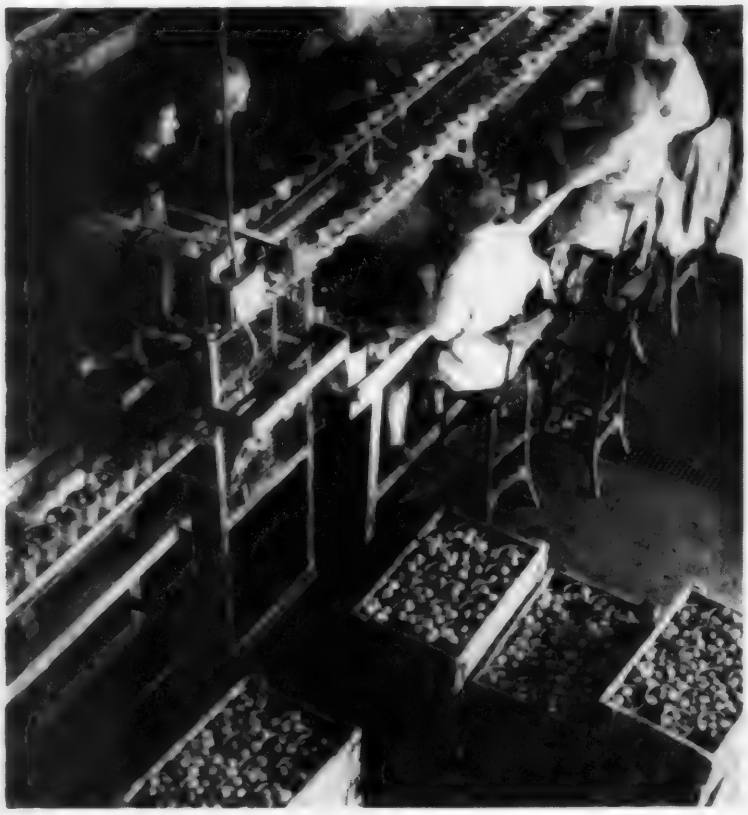
Yours faithfully,
For John Burgess and Son, Ltd.
F. C. MATTHEWS, *General Manager.*

FRUIT AND VEGETABLE CANNING IN SUFFOLK



Above: On arrival at the factory the plums are graded for size. In this factory graders have been converted into a battery of machines.

Below: Operatives at the packing tables which have been designed to suit special conditions.



Situated on the river Deben, the factory of the Woodbridge Canning Company was built in 1930, the original premises having been extended from time to time. All the produce canned in this factory is grown locally in contrast to pre-war days, when fruit was shipped direct from Rotterdam to the company's private wharf at Woodbridge

EQUIPPED to can vegetables and beans in tomato sauce when the necessary labour is available, the Woodbridge Canning Company works all the year round. During the seasons the factory turns out 48,000 cans of fruit and 40,000 cans of fresh garden peas per day.

Plum Canning

When a FOOD MANUFACTURE representative visited the factory plums were being canned. On reaching the factory the plums are graded for size and then conveyed to the packing tables. Here the fruit is packed at the rate of 60 cans a minute and passed by conveyor belt to the syruping plant. Two 120 gal. tanks feed the syrupers by gravity feed.

Processing Routine

After filling, the cans are lightly clinched before going to the exhauster. Disc and chain type exhausters are in use in the factory, the cans being subjected to a temperature of 195° F. for seven minutes. After

seaming, the cans are conveyed to the retorts and subjected to a temperature of 212° F. for eight and a half minutes, then cooled to 90° F.

Next comes the labelling operation. The labels are picked up automatically from the pile, the first end of the label being securely fixed to the can by a non-rusting cement. The label is then drawn tightly round the can and the second end pasted down on top of the first end. The small amount of paste used enables the cans to be packed immediately into cases on emerging from the machine.

The packing boxes, containing the cans, are sealed by hand with glue and stacked ready for delivery.

In addition to a well-equipped laboratory, there is a complete pilot canning line for experimental purposes.

Above: The tank for feeding the syruping plant is seen on the left above the clincher. From here the cans are subjected to the usual processing operations.

Right: After processing the cans are automatically labelled, and packed ready for delivery.

Below: The small hand seamer is used in conjunction with the pilot plant.

LIST OF SUPPLIERS

Syruping plant, exhauster, pea line, retorts, and cooler: *Mather and Platt, Ltd.*
Cans, clincher, and seamer: *Metal Box Co., Ltd.*
Temperature control and recorders: *Short and Mason, Ltd.*
Boiler: *Davey Paxman and Co. (Colchester), Ltd.*
Steam pans: *Brierley, Collier, and Hartley, Ltd.*
Small retort: *Cocksedge of Ipswich.*
Labelling machine: *The Beth Label and Wrapper Machines, Ltd.*
Cranes: *Vaughans of Manchester.*
Beet sugar: *Ipswich Beet Sugar Factory.*

Photos: Leonard Hill Limited.

Acetic Acid Preserves

Part III

J. R. BURRELL

PICCALILLI is a mixed pickle in which a yellow mustard sauce has taken the place of the fortified vinegar. The relative amounts of sauce and cut vegetables are approximately equal, and it is necessary to keep to the same acid conditions as for other acetic packs (3·6 per cent. overall acidity as acetic).

Mustard, turmeric, curry, ginger, gum tragacanth, vinegar, as well as wheaten or other flour spices, sugar, salt, and colour, comprise the sauce ingredients.

There are many recipes, but most of them do not deviate greatly from the following:

	Per Cent.
Vinegar (5%)	84·0
Wheat flour	3·0
Mustard	5·0
Turmeric	1·5
Piccalilli yellow	0·1
Salt	1·0
Sugar	1·5
Curry	0·2
Ginger	0·2
Gum tragacanth	0·7
Acetic acid (80%)	2·8

Preparation of Sauce

Some of the vinegar is withdrawn from the total 84 per cent. in order to make up a solution of the gum tragacanth, *i.e.* 14 lb. vinegar to the ¾ lb. gum required if the percentage figures are regarded as pounds. The remaining vinegar (70 lb.) is put into a pan fitted with a stirrer. The latter is switched on and the solids are gradually added. When the addition is complete and the materials thoroughly mixed, the contents of the pan are heated until the starchy constituents are gelatinised. The gum solution is then added, and after ten minutes or so at just under boiling point, the 80 per cent. acetic acid is added.

The sauce is put through a sieving machine, and after cooling is tested for its acetic acid content, which, if necessary, is brought up to 6½ per cent.

The acetic content of the water constituent is in the region of 7 per cent. in this case.

The cut vegetable and small onions may be either mixed with the liquor in bulk and kept in stock in casks, which are filled right up and then headed, or they may be drained and mixed in the actual jars in which the product is to be marketed.

Separation Problems

The greatest trouble met with in piccalilli is separation of clear liquid from the sauce. This takes either, or both, of two forms.

In one of these there is eventual formation of a clear zone at the top of the jar, and in the other there is a pocket of clear liquid surrounding each piece of vegetable. The former, which is due to imperfect mixing and gelatinisation of the starch during manufacture of the sauce, may be prevented by paying careful attention to the temperature of the cooking operation and can be checked by viscosity tests during manufacture.

The other defect is brought about by osmotic influences resulting from differences between the soluble solids content of the vegetable and the sauce. Thus, if the sauce has a greater density than the vegetable there will be a tendency for the latter to shrink and exude a clear liquid into the yellow sauce. If, on the other hand, the sauce is less dense than the vegetable the latter will swell somewhat.

Since there is certain to be some difference in the soluble solids content of the two materials, it is difficult to avoid the possibility of " pocket " separation by attention to theoretical principles, especially as the osmotic action is bound to continue until equilibrium has been reached. However, if the vegetables and sauce are kept together in bulk for some time before filling out, the two materials have time to reach equilibrium before bottling, and a thorough mixing with a wooden spaddle will have the effect of causing absorption of the separated clear liquid by the sauce.

This is found to be inconvenient and messy in actual practice, and various methods have been tried to get over the difficulty. Thus, it has been suggested that it might be more convenient if the sauce and vegetables brought into a state of equilibrium in bulk might be separated by being put through a wicker container and the usual filling process then followed, *i.e.* the sauce is first put into the jars and the vegetable put in afterwards. If the reverse procedure is followed, there will be increased danger of air bubbles, leading possibly to separation and large airspace on settling.

Normal Procedure

The requisite weight of yellow liquor is put into the jars, which are then filled to the correct height by the addition of the cut vegetables. This is the most convenient, least messy, and most rapid method to follow, but in order to minimise the possibility of separation the vegetables must be thoroughly drained before filling out. If the draining results in a certain amount of drying, so much the better, as it concentrates the soluble solids and so has a greater tendency to absorb the sauce rather than to exude liquid.

However, mixing in bulk is safer, and all the factors must be weighed up before deciding which method it is desirable to follow.

As with the packs previously mentioned, due attention must be paid to the aspects of efficiency of closure; having as small a headspace in the jar as possible and the overall acidity. Since it is the acidity of the water content that is important, the addition of other materials has the effect of making for a slightly lower overall acidity of 3·6 per cent. This point, however, is not a vital one in this particular product, as the soluble and insoluble materials present are not sufficiently high to influence the acidity to more than a slight extent. This point has been dealt with more fully in the first section.*

PICKLED RED CABBAGE

The shredded material for pickled red cabbage is usually drysalted by mixing salt with the shreds and subjecting the mass to the pressure of a wooden head, weighted down, in order to achieve a uniformly salted product in which each particle of vegetable is in contact with the brine formed by the salt and the water expressed by osmosis from the cabbage. The salt is added to the extent of 7 per cent. to 10 per cent., and is allowed to act from twenty-four to thirty-six hours.

The brine is drained off and the material is either given its finishing vinegar treatment in casks or vats or in the actual bottles in which it is to be marketed.

In both cases, however, it is necessary to know the weight before the vinegar is added. If the material is to be loosely packed in the jars and there is roughly an equivalent quantity by weight of the vinegar and cabbage, the acidity of the vinegar will have to be reinforced so as to bring the acidity to 7·2 per cent. and so provide an overall acidity of 3·6 per cent. on the finished product.

If the cabbage is to be tightly packed in the jars it will be found that approximately twice as much cabbage as vinegar will be present. In this case the vinegar to be strong enough to give a similar overall acidity as before will have to be fortified with 80 per cent. acetic to 10·8 per cent. acetic strength. This pickle will keep for months, but it is different from the usual pickles in that the cellulosic structure has not been modified to the same extent, and it is more crisp than these owing to the shorter period of salting.

The brining action in the case of red cabbage is not so much a fermentation process as a means of extracting some of the water and pungent properties of the cabbage. Fermentation does occur to some extent, however, as the leaves of the cabbage bear great numbers of lactic micro-organisms on their surface, and the surface area per standard weight is considerable in the shredded vegetable.

After a month or two the shreds begin to lose their crispness, and by imperceptible degrees the softening continues, until by the end of six months it is usually noticeable, and in a year from bottling the product has often passed its shelf life.

Precautions to be taken to prevent spoilage are precisely similar in character to those obtaining with the pickles already mentioned.

MUSHROOM KETCHUP

Mushroom ketchup is often prepared from mushrooms that have been left over as a by-product of soups preparation or from canning. Broken and contused fungi and the stalks are used in this case. The fungoid residues, as described, are thrown into a wooden vat and mixed with salt. After a period in which a brine is formed, the material is transferred to a stainless steel pan, spices are added, and the whole is brought to the boil and simmered for fifteen minutes or so. After this, the black liquid is adjusted to correct salt content, sieved, and then filtered prior to bottling or casking.

It is claimed by some that a cold process is best, as some of the delicate volatile flavours of the mushroom are lost by heating. In this case there is a roughly similar procedure in the first stages, but in order to assist salt penetration in the salting period, it is wise to add about 10 per cent. of salt by weight and to increase this after some hours.

In any case, the salt content of the finished ketchup must be high enough to ensure keeping whichever method is used.

Since this sauce is mainly used as a concentrated flavouring ingredient only, a high salt concentration does not militate against its commercial value, so that enough may be added to saturate the moisture present.

Ingredients for a concentrated sauce are as follows:

Mushroom residues	25 lb.
Salt	25 lb.
Water	5 gallons
Pepper	3 oz.
Paprika	1 oz.

This may be diluted with water, coloured with caramel, given hot flavour with capsicum, and bottled as a cheaper product. However, it is important that the salt content must still be adjusted to give a salt percentage of 20 per cent. or so in the finished product.

SWEET PICKLES AND CHUTNEYS

Apart from products with a restricted market value such as the normal acid pickles sweetened with a little sugar or saccharin, sweet pickles and chutneys usually consist of comminuted vegetables and fruits boiled together with sugar and spices and then mixed with a sweet sauce.

* Food Manufacture, April, 1948, p. 168.

Primary considerations in their manufacture are:

1. The vegetables must be well syruped.
2. The sauce must not be prone to separation.
3. The acidity, calculated as though it were concentrated in the water ingredient alone, should be 3·6 per cent. or more. (This latter point is more fully dealt with under "Sweet Thick Sauces" and also in Part I.)

Almost any edible vegetable or fruit may be used. Mangoes in syrup, apples, brined carrots, stringless beans, beet, cucumber and cauliflower, seedless raisins, currants, sultanas, and dried apricots are examples.

Syrup Fraction

The syrup fraction represents only 30 per cent. to 40 per cent. of the whole as a rule and consists of cooked, pulped, and sieved vegetables and fruits together with spices, vinegars, and thickening ingredients such as gum tragacanth.

Methods of Preparation

The brined or raw diced or cubed vegetables are put into a boiling pan with a minimum quantity of water—rather less water than will cover them before cooking. The mixture is brought to the boil, and when soft the water is drained away and a quantity of flavoured sugar syrup added. The following is a typical recipe of thick sweet pickle.

Brined cauliflower stumps	50 lb.
Brined carrots	25 lb.
Brined apples	25 lb.

These undergo the softening process already mentioned, and the syrup, prepared as follows, is added:

Sugar	18 lb.
Water	50 lb.
Ground cinnamon	3 oz.
Ground cassia	3 oz.
Ground pimentos	8 oz.
Ground cloves	1 oz.
Ground coriander seeds ..	3 oz.
Acetic acid (80%)	2¾ pints

The acetic acid is added at the end of the fifteen minutes' boiling period, and a further five minutes' boiling is required to finish.

Sauce

Water	27 gallons
Vinegar (5%)	31 gallons
Sugar	200 lb.
Gum tragacanth	13 lb.
Salt	27 lb.
Flour	60 lb.
Onions	60 lb.
Molasses	25 lb.
Caramel	3 lb.
Curry	3 lb.
Paprika	2 lb.
Acetic acid (80%) ..	3 gallons

Methods of Preparation

Fifteen gal. of the vinegar is set aside from the total to be used in the batch for the purpose of swelling the gum tragacanth.

This must be prepared beforehand, as a minimum of thirty-six hours is needed for soaking if the shreds or pieces are large.

The flour also needs to be whisked up into an even suspension prior to mixing with the other ingredients, and some of the water for the batch is used for this purpose.

The rest of the materials are mixed together in a jacketed pan, the flour is added, and then the gum after the mixture has reached boiling point. The acetic acid is put in last, after the sauce has been simmering for twenty minutes or so. After a further five minutes the sauce is ready for sieving and barrelling.

Both the sweet solid portion and the sauce may be considerably cheapened, but the acid and water relationships must be adhered to.

The ratio of the solid ingredients to the sauce is approximately three parts of the first to one of the latter by volume.

CHUTNEYS

Many people have different ideas as to what constitutes a chutney, and no doubt many will disagree with the suggestion that generally speaking chutney has come to mean a sweeter than usual thick sweet pickle.

Many chutneys are prepared in the home with low sugar content. These are opaque and generally serve their purpose. The commercial article, however, is usually so high in sugar as to have the semi-transparency of well-syruped vegetables and fruits.

Some varieties of thick sweet pickles now on the market have sugar content in the region of 50 per cent., and in the author's opinion these would be better regarded as chutneys from the point of view of significant nomenclature.

Thus, for the sake of clarity and to give a definite meaning to the terms, it would be useful to have medium sweet pickles, having sugar content up to, say, 15 per cent., sweet thick pickles up to 30 per cent., and chutneys up to 60 per cent.

Since the only real difference lies in the sugar content, chutney recipes, generally speaking, will only be alternative sweet thick pickle recipes, plus extra sugar.

The finished product may in some cases contain larger pieces of fruits or vegetables or both, and the solids have the semi-transparency of well-syruped vegetable material.

The sugar content, therefore, may be between 30 per cent. to 60 per cent., and the acidity, varying according to the moisture content, will be 2·5 per cent. or lower in consideration of the keeping principle set down in the first article.

If the chutney is to be filled out at, or above, 180° F., and steps are taken to sterilise the inside of the cap by inverting the bottle immediately after filling out, the acidity may be lowered even

more and the sugar also may be considerably reduced.

However, the high sugar content product is the better viewed from both flavour and keeping angles, and it may be kept in stock in barrels to be filled out cold later when required.

As to ingredients, almost any variety of fruit or vegetable may be used, and if the sugar content is in the region suggested, no gum will be required. The flavouring is sometimes less obvious than in a sweet thick pickle, and in this case the spices are therefore used in smaller quantity.

Typical Recipes

1.	Water	1¾ gallons
	5 per cent. gum in malt vinegar	1 gallon
	Brown sugar	20 lb.
	Minced carrots	15 lb.
	Dates (stoned and minced)	10 lb.
	Seedless raisins	5 lb.
	Chopped onions	5 lb.
	Caramel	5 oz.
	Acetic acid (80%)	2½ lb.
	Salt	2½ lb.
	Ginger	4 oz.
	Cayenne pepper	2½ oz.
	Paprika pepper	2½ oz.
	Ground cinnamon	½ lb.
	Ground coriander	2 oz.
	Ground pimentos	2½ oz.
	Ground cloves	1 oz.
2.	Water	½ gallon
	Sugar	25 lb.
	Peeled tomatoes	20 lb.
	Apples (chopped)	20 lb.
	Raisins (seedless)	5 lb.
	Onions (raw or brined)	5 lb.
	Acetic acid (80%)	2 lb.
	Ground ginger	2 oz.
	Ground cayenne	½ oz.
	Ground paprika	1 oz.
	Ground cinnamon	4 oz.
	Ground pimento	1 oz.
	Ground cloves	1 oz.

The carrots and onions in the first recipe and the apples and onions in the second and the water are boiled together for fifteen minutes in a jacketed pan and the sugar is then added. After a five-minute period of simmering, the dates, gum solution, caramel, spices, and salt are added. The product is agitated continually by wooden spaddle or mechanical stirrer, and after a further fifteen minutes the acetic acid is added.

Five minutes' more simmering and the product is ready for casking and may be bottled after three days.

This chutney requires no sieving machine for its manufacture, and a mincer and jacketed steam pan are all that is necessary for its production. Chopping or dicing, however, is preferable to mincing.

If a cheaper product is required more water may be added; up to 1·5 per cent. gum tragacanth may be incorporated for thickening purposes, and the acetic acid content adjusted on the basis of the 3·6 per cent. acidity on the water content scheme. If a weakly acid (1 per cent. to 2 per cent.) product is required with cheaper, lower sugar content article, it will be necessary to fill out hot and/or sterilise at 180° F. in a water bath after capping.

THICK SWEET SAUCES

Thick sweet sauces are prepared by working together and sieving mixed ingredients such as fruits, vegetables, spices, thickening agents, acetic liquors, and sugar.

The finished sauce should have "body" sweetness, acidity, varying according to principles already laid down as to sugar content, and a flavour of mixed spices. The viscosity should be such that the sauce may flow from the neck of the bottle without undue shaking, such as sometimes leads to spattering of walls and tablecloths with the contents, but at the same time it should be prepared to resist separation of solid and liquid constituents.

Basic Ingredients

Dates, raisins and/or sultanas, apples and onions, gum tragacanth, tomato *purée*, acetic acid, and sugar are included in the usual basic ingredients. Sometimes beet, carrots, turnips, swedes, dried apricots, and prunes may find a conspicuous place in the recipes; for, provided vegetables are well pulped and syruped, there is little limit to the types that may be used in sauces.

Whenever prunes or dried apricots are used, they should be reconstituted by soaking and then boiled before using, otherwise they will not become fully softened prior to pulping.

Fundamentally the sauce may be a weak pectin-sugar gel, in which gum acts as an additional thickening agent, an acid syrup solution of gum tragacanth, or a mixture of both of these.

In any case the finished material must not "set," and the thickening must be partly due to suspended solid matter of the fruit and vegetable constituents.

Thickening Agents

It is now well known that a great many thickeners that produce mucilages of high viscosity in neutral solutions break down under the combined effects of heat and acid, so that sauces prepared from these otherwise excellent products will be prone to show separation on storage.

Gum tragacanth is most suitable as a thickener, for, although it is subject to breakdown to some extent under conditions of heat and high acidity, it is more stable than most other agents and its behaviour from other points of view also is reliable.

When preparing thickeners other than traga-

(*Continued on page 275*)

Vitamin Standardisation

IT is now some twenty years since vitamins started to creep out of academic research laboratories into industrial and commercial laboratories, and in both places much has been done in working out methods for their determination during that period. None has been more assiduous in this direction than Dr. Coward, the appearance of whose book in 1937 was, metaphorically, a half-way house at which most people concerned with vitamin estimation have called with considerable frequency, and always found the help and stimulant which they sought. The appearance of a new edition* now, ten years later, is, therefore, an event which is bound to rouse the interest of workers in the vitamin field.

Much has happened in the interval both in the technique of the estimations and of the interpretation of the experimental data. The chemistry, as well as the biochemistry, of most of the vitamins has become clear, with the result that chemical, physico-chemical, and microbiological methods have become available in many cases. Nevertheless, biological methods still have their place, and, indeed, in some cases are still the only ones available. There is, therefore, a continuing need for a book, particularly a laboratory handbook, specialising on the subject. This need has been admirably filled by Dr. Coward's book, though the new edition does not fully reflect the advances which have been made during the last decade.

Biological Assay

The title of the book is misleading; the subject matter is not the standardisation of vitamins but the determination of vitamins in various products in terms of certain internationally accepted samples which play the same part in vitamin measurement as do the standard yard kept in London or the standard kilo kept in Paris in the measurement of length or weight. A more appropriate title would therefore be "The Biological Assay of Vitamins." The book is somewhat limited in scope and is confined to vitamins A, B_1, C, D, and E, presumably since these are the only ones for which international standard preparations exist. This may be the reason why the only addition to the previous edition is vitamin E, for which an international standard was first made available in 1940. It is somewhat disappointing at this stage of development to find these limitations. It may, with some justification, be argued that the other vitamins such as riboflavin and nicotinic acid can be determined more readily by other methods, but biological methods do exist and biological assays are sometimes specifically asked for.

Biological methods require the use of animals, and the quality of the animals is as vital as the purity of chemical reagents. Breeding, feeding, and housing are therefore important. Some attention is given to these subjects in the consideration of each vitamin. Naturally, the amount of such attention must be limited in a book of this kind, but it is surprising to note the omission of references to recent works on this question of animal maintenance such as Griffiths and Farris's *The Rat in Laboratory Investigations* (1942) and the monograph *Animal Colony Maintenance* issued by the New York Academy of Science (1945). The reference to work published in 1934 prior to the publication of the first edition of the book as "recent investigation," leads one to wonder whether the printers have not been an unconscionable time in bringing to life this second edition, which would account for these omissions.

Changes in Technique

Some rearrangement of the subject matter has been done, and the book is now divided into two parts. The first deals with the operations involved in the assays and with calculations of the results; the second with that statistical basis which is now a *sine qua non* of the interpretation of the data of observation. In the first part, Dr. Coward emphasises the experience of most workers that there is a great variation in the behaviour of animals at different times in the same laboratory and also in different laboratories. This realisation has led to the most marked change in technique since the first edition appeared, and the new edition stresses the view that an assay must be self-contained without relying on the evidence of previous assays—"it is now generally agreed that the limits of error of a determination should be calculated from the data supplied by that determination and not from a general estimate from many determinations." The effect of this on experimental design has been to increase the number of animals and of dose levels and, alas, of the cost. All the procedures are illustrated by examples from Dr. Coward's laboratory, which again reminds us that Dr. Coward has been a pioneer in this matter of biological assay.

The statistical treatment of the experimental data has been brought up to date by the inclusion of the methods developed by statisticians like Bliss, Irwin, and Feiller, and examples of the analysis of variance have been included. The use of litter mates for each dose is advocated only in certain cases where Dr. Coward's investigations have shown considerable inter-litter variation. Other

* *The Biological Standardisation of the Vitamins*. By Katharine H. Coward, D.Sc. 2nd Edition. Pp. 224+vii. London. Price 12s. 6d. net.

workers advocate their more extended use. We detect an error in terminology in the use of "intra litter" for "between litters" and "inter litter" for "within litters." The mathematical side of biological assay seems to hold some terrors for the tyro—terrors which vanish when resolutely faced. It is unfortunate, therefore, that a certain lack of clarity in parts of the mathematical exposition should lead to confusion. Thus, in the diagrams on page 6, x is used to denote the dose in one case, the logarithm of the dose in another, and one does not realise this without some searching. Again, on page 40, the statement occurs that "the horizontal distance between these lines is $\frac{y}{x} = b$." The distance in question is x, which becomes evident on further study. The reviewer was much confused on page 189, where in the table x is the response, but in the treatment of the data following the table it is also used for the logarithm of the dose. Our preoccupation in these days with getting sufficient to eat without worrying overmuch about its vitamin content enables us to view with a sympathetic eye the use of "ration" for "ratio" on page 100.

These, however, are minor blemishes in a work which is justly regarded as a classic in its field—so much so that until this last year no other has had the temerity to enter that field. There can be no doubt that it will continue to be so regarded and to be found where one has so often seen it during these last ten years—on the desk and on the laboratory bench, on active service.—J. I. M. J.

Acetic Acid Preserves

(*Continued from page 273*)

canth, it is often preferable to disperse the powdered material in water and to acidify later in the actual sauce, as a mucilage of high viscosity is often achieved by so doing.

One at least well-known patent thickener of the vegetable gelatine type thickens considerably on addition of acetic acid solutions, so that this fact has to be taken into account when preparing a sauce in which it is to be used.

Prevention of Fermentation

Unlike the "sour" pickles in which the vegetables have largely lost their sugars by lactic fermentation prior to their being bottled in vinegar, these sauces have a large sugar content, and provided the acid-sugar-water relationship is such as not to be inimical to their growth and multiplication, bacterial and fungoid agents may soon produce active fermentation if they somehow or other obtain access to the sauce following bottling.

However, as it has already been pointed out, the "keeping" acidity that has been found high enough to prevent the growth of practically all yeasts, moulds, and heterofermentative lactobacilli is based on the formula:

$$\text{Keeping acidity or } \frac{\text{Overall acidity} \times 100}{\text{water content}}$$

must be 3·6 per cent. Thus, the higher the solids the lower need be the acidity.

Preparation of the Sauce

If turnips, beet, carrots, apples, or similar vegetable products are to be used, it will be necessary to cook and pulp these prior to adding dates, raisins, or sugar, otherwise the osmotic effect of the sugar present will retard the required softening to some extent.

The dates, raisins, tomato *purée*, sugar, and spices are then added. The whole is brought to the boil in a jacketed pan and simmered with constant stirring for three-quarters of an hour or so. The gum tragacanth solution (2½ per cent. in vinegar is an ideal strength) is then added, and after a further ten minutes the addition of acetic acid to bring the acetic content to the necessary level is then made. After a final five minutes' period of stirring, the sauce is ready for casking.

The following are basic recipes.

SWEET THICK SAUCE

Vinegar (5%)	37 lb.
Apple pulp	27 lb.
Tomato *purée* (single conc.)	11½ lb.
Dates	7⅜ lb.
Sultanas or raisins	6½ lb.
Chopped onions	2 lb.
Sugar	4½ lb.
Salt	1½ lb.
Water	2⅜ lb.
Gum tragacanth	5 lb.
Ground ginger	2½ oz.
Ground cayenne	½ oz.
Ground cloves	½ oz.
Bay leaves	½ oz.
Paprika	½ oz.
Curry	½ oz.
Ground cinnamon	½ oz.
Ground cassia	½ oz.
Ground coriander	½ oz.
Caramel	*q* s.

TOMATO KETCHUP

Tomato *purée* (single conc.)	63½ lb.
Sugar	15 lb.
Distilled vinegar	6½ lb.
Water	6½ lb.
Salt	2 lb.
Minced raw onions	5 lb.
Gum tragacanth	1 lb.
Essential oil of cloves	1½ cc.
Essential oil of cassia	3 cc.
Essential oil of cinnamon	3 cc.
Essential oil of coriander	1½ cc.
Essential oil of pimento	1 cc.
Essential oil of garlic	1 cc.
Essence of capsicum	5 cc.

(*To be continued*)

BEEF

FROM HOOF TO CAN

Of the 80,505 tons of beef exported by Australia in 1946-1947, approximately 68,000 tons came to Britain, in addition to a large part of the total export of canned meat. About 80 per cent. of the meat canned by the Central Queensland Meat Exporting Company is sent to this country.

Cattle from the savannah lands of Northern Australia are driven to the stockyards through country thinly scattered with eucalyptus trees and aromatic shrubs.

CATTLE from the hot savannah lands of the North feed the Central Queensland Meat Exporting Company at Lake Creek, Rockhampton, Queensland, Australia's biggest meat cannery.

After slaughtering, the hides are removed and the carcasses inspected by Commonwealth Government Veterinary Officers and Meat Inspectors, who pass meat fit for human consumption and supervise all subsequent processes. Fancy meats such as livers, hearts, and kidneys are trimmed and prepared for freezing. Certain glands are frozen for pharmaceutical uses, and a number of other by-products are utilised for the manufacture of gelatine, glue, and neat's-foot oil. Tails, hair, hooves, horns, and long bones are converted into useful products, and sausage skins are made from the cleaned and treated intestines. Other residues are treated for fats and oils, meat meal and bone meal, feedingstuffs, and fertilisers.

In the slaughterhouse the carcasses, after being divided into sides by an electrically driven circular saw, are passed to a chiller. Meat selected for canning, after it has been thoroughly chilled, is delivered to a boning room where bones, cartilage,

Established sixty years ago, the Lake Creek factory covers half a mile frontage on the Fitzroy river, 2,000 men and women being engaged at the cannery in the killing season from March to October.

After slaughtering and inspection by Commonwealth Government Veterinary Officers, the carcasses are divided into sides by an electrically driven circular saw and passed to the chilling room.

and serous membranes are removed. The boneless meat is then roughly sliced and delivered by mechanical means to the "cook" room. The meat is diced to the required size through a cutting machine and falls into a metal skip containing about 900 lb. of meat, which is lowered into a boiling tank and scalded for half an hour. The curing of the meat by a special process, together with the salting, is done while the hot meat is lying on the sorting tables. Next, the meat, roughly weighed out, is fed by hand into filling machines which force the hot meat into the cans.

Workers complete the filling of the cans, check and re-check weights, and place the filled cans on travelling belts for conveyance to the combined double seaming and vacuum closer. The cans are then ready to be sterilised, which is carried out in retorts with a capacity of from 400 to 1,000 cans according to their size. On emerging from the retorts they are washed, dried, and lacquered.

All cans are incubated for the time necessary for faulty packs to become evident, and the 12 oz. cans are fitted with keys for easy opening.

The tops and bottoms of the 6 lb. cans are "sweated" on to the body, leaving only a stud hole some 1½ in. in diameter through which the meat is filled. After filling they are first "bridged" with a disc of tinplate to avoid solder falling into the meat, and a cap soldered on over the bridge. The cans enter a circular vacuum machine by which a high vacuum is produced in them, the air being sucked out through a small puncture in the cap. When this operation is finished, the puncture is sealed with a small "blob" of solder. When the cans finally emerge from the retort and are cooled, atmospheric pressure working against the vacuum in the cans produces the necessary collapse of the sides and tops and the compression of their contents.

Above: From the freezers, the beef destined for canning goes to the boners, where bones, cartilage, and serous membranes are removed. The boneless meat is then roughly sliced and delivered to the "cook" room.

Left: After scalding, the boneless meat is minced and fed by hand to filling machines which force the hot meat into cans. Men and girls weigh and pack cans which pass along an endless belt to the retorts.

Below: The cans are cooled after leaving the retorts, treated with anti-rust lacquer, and fitted with opening keys. Cans with labels are intended for local markets, those without being for export.

Packaging and Display

DEVISED and produced as a comprehensive reference book for the use of sales directors, advertising managers, packaging advisers, and all those concerned with the sale of goods, a recently published encyclopaedia* deals in a clear and concise manner with the various types and methods of packaging and display as applied in all important industries. New and improved methods and materials, such as Pliofilm, wet strength papers, impregnated fibreboard, quick freeze packing, silk screen printing, heat sealing, viscose film, bags, and self-adhesive tapes, are fully described. Makers' schedules of equipment, processes, and materials at present available are included, and will be found of constant value when ideas have become crystallised into practical requirements.

This work is profusely illustrated by hundreds of photographs in half-tone, diagrams and colour plates, showing modern examples of design in packaging and the application and use of packaging materials, and has been produced with the collaboration of an advisory panel consisting of thirteen well-known people, while fifty experts have contributed special articles.

A classified directory of firms and a comprehensive index facilitate easy and rapid reference to this monumental work.—T. C-W.

* *Packaging and Display Encyclopaedia*. Pp. 880. London. Price 63s. net.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, May 1, 1948, page 202.

No.	*Date.* 1948.	PRICE FIXATION ORDERS
538	Mar. 17.	Order amending the Canned Puddings (Maximum Prices) Order, 1945. Revokes S.R. & O. 1946, No. 509; 1947, Nos. 596, 928.
592	„ 22.	Order amending the Eggs (Control and Prices) (Great Britain) Order, 1946.
596	„ 22.	Order revoking the Electricity (Price Control) Order, 1948.
620	„ 25.	Order amending the Pulse (Control and Prices) Order, 1943.
		CANNED FRUIT AND VEGETABLES
397	Feb. 26.	Order amending the Canned Fruit and Vegetables (No. 2) Order, 1946.
		FEEDINGSTUFFS
650	Mar. 30.	Order amending the Feedingstuffs (Rationing) Order, 1943. Revokes S.R. & O. 1947, No. 2776.
		FOOD SEIZURE
724	Apr. 8.	The Seizure of Food Order, 1948. Revokes S.R. & O. 1946, No. 1823.
		HOME GROWN GRAINS
619	Mar. 24.	The Home Grown Grains (Agricultural Executive Committees) Order, 1948. Revokes S.R. & O. 1939, No. 1685; 1940, Nos. 117, 548, 549.
		INFANT MILK FOODS
790	Apr. 16.	Order amending the Proprietary Infant Milk Foods Order, 1947.
		MEALS IN ESTABLISHMENTS
744	Apr. 13.	Order amending the Meals in Establishments Order, 1946. Revokes S.R. & O. 1947, No. 2587.
		NUT KERNELS
692	Apr. 5.	Order amending the Nut Kernels Order, 1947.
		ONIONS
539	Mar. 17.	Order amending the Onions Order, 1946.
		POINTS RATIONING
630	Mar. 25.	Order amending the Food (Points Rationing) Order, 1947.
		POTATOES
311	Feb. 19.	Order amending the Potatoes (1947 Crop) (No. 2) Order, 1947.
690	Apr. 5.	Order amending the Potatoes (1947 Crop) (No. 2) Order, 1947.
		RATIONING
301	Feb. 19.	Order amending the Food Rationing (General Provisions) Order, 1947.
411	„ 27.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1947.
448	Mar. 4.	Order amending the Food Rationing (General Provisions) Order, 1947.
591	„ 20.	The Food Rationing (General Provisions) Order, 1947 (General Licence No. 3) Order, 1948.
691	„ 24.	The Food Rationing (General Provisions) Order, 1947 (General Licence No. 2) Order, 1948.
662	Apr. 1.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1947.
		WELFARE FOODS
791	Apr. 16.	Order amending the Welfare Foods Order, 1947.

Cost Accounting in the Food Industry

HARRY DUGDALE, A.L.A.A., A.C.W.A.

Part III

Previous articles in this series showed that the total cost of food manufacture comprises charges in respect of materials, labour, and overheads. Thus far costing under the headings of materials and labour has been considered. In this article the author reviews the position of accounting for overheads.

IT is when the Cost Accountant turns his attention to the accounting for overheads that difficulties arise. Overhead charges, in a modern factory, are many and varied. They are resultant, to a large extent, upon the extensive mechanisation of industry which has proceeded rapidly in recent decades. When goods were chiefly the product of hand labour, *i.e.* prior to the introduction of machinery, overheads were of relatively small significance. But, with the growth of mechanisation, many new factors arose, each bringing its quota of overhead expense. Thus, continuous band plant requires considerable space, and often results in a large factory, at a high purchase cost, or high rental. The machinery must be motivated, giving rise to a requirement of steam and/or electric power. Continuous usage of plant demands regular maintenance, and a plant service complement is thus brought into being. Large factories, with a diversity of processes, usually entail an effective division of the direct labour force, and this, irrespective of whether the direct labour is working on piecework, bonus, or other type of incentive scheme, calls for a body of supervisors. Factory heating, lighting, depreciation of plant, and the provision of personnel amenities such as a works canteen and works hospital treatment, are all potent factors in the scheme of overheads. Modern administration of factories requires time-study services, effective production planning, a capable accountancy staff, and a personnel department. Moreover, selling and distribution charges, especially in a competitive market, are of no small account. Advertising must be conducted to keep the name of the company and of its products in front of the purchasing public; a staff of outside representatives must be maintained to secure new customers and to provide satisfactory sales service to the existing clientele.

Changes in Costing

It should be readily apparent, therefore, that the constituent parts of total manufacturing cost have altered radically in their respective proportions over the past thirty years. Where overheads formerly represented a small proportion of the whole, it is now quite possible for them to be as much as 50 per cent. of the total cost. The proper ascertainment and control of overheads is of paramount importance if economic costs of production are to ensue.

Initially, from the viewpoint of cost ascertainment, it is essential that the fullest analysis of overheads be obtained, as their nature differs considerably and their recovery in costs may demand the use of various bases simultaneously. Hence, to obtain a proper appreciation of the nature of overheads, it is necessary to schedule them under the three broad divisions of Factory Overheads, Administrative Overheads, and Selling and Distribution Overheads. Where, in practice, a cost accounting system has not been in operation, then a careful examination should be made of the company's Nominal Ledger, to obtain data of the nature and incidence of the various items of overhead charges. The following is an "outline" indication of the types of overhead:

Factory Overheads:

Rent of factory.
Rates of factory.
Depreciation of plant and machinery.
Cost of steam and/or electric power production.
Cost of electric power and lighting where purchased from an outside supplier.
Stores handling charges and stores-keepers' wages.
Cost of indirect labour, *i.e.* checking labourers, etc.
Cost of plant maintenance.
Cost of renewals to plant and machinery.
Cost of factory consumable stores, *i.e.* cleaning materials, lighting bulbs, small tools used in manufacturing processes, etc.
Cost of drawing office staff.
Cost of canteen operations, if canteen is run at a loss.
Cost of welfare.
Cost of "holidays with pay."
Cost of company's contributions in respect of National Health and Unemployment Insurance.
Cost of buying department.
Cost of personnel department.

Administration Overheads:

Fees and salaries of working and other directors.
Legal and professional fees.
Salaries of accountancy and secretarial staff.
Travelling expenses incurred by directors and other executives.
Cost of research department.

Selling and Distribution Overheads :

Salary of sales manager.
Salaries and expenses of outside representatives.
Cost of packing and despatch departments.
Cost of running and maintaining the company's transport fleet.
Cost of advertising.
Cost of making and distributing samples of the company's products.
Cost of outside showrooms.
Cost of stands at Trade Fairs and Exhibitions.
Cost of containers.
Provision for bad debts.

Many of the overheads met with are capable of segregation, without undue trouble, in the three broad divisions already referred to. Others may appear to be somewhat arbitrary, and their appropriate venue is usually settled by asking the question: "Is this charge brought into being when the goods are produced, or does it arise later in connexion with the disposal of manufactured goods?"

The study of overheads, made via the Nominal Ledger, should not be confined to the accounts of the year preceding the installation of the cost accounting system. It is more prudent to study the charges over a minimum of three years. This will enable expense trends to be readily visualised.

In recovering overheads applicable to current production in the factory, it is a fact that certain of the charges scheduled with the various types of overheads may not yet have crystallised in the form of actual recorded charges in the financial books. It is obvious, therefore, that following the study of expense accounts over a period of three years, a schedule must be prepared in respect of overheads applicable to factory, administration, and selling and distribution, and the amounts scheduled must, of necessity, be estimates of anticipated expense, because the actual expenses will not be known until suppliers' invoices come in and are duly recorded. This, then, is the reason why at least three years' prior expenses should be studied before estimating the overhead expenses applicable to the current year. This detailed analysis tends to ensure that the estimated expenses are reasonably valid in connexion with a proposed level of production.

Allocation of Overheads

With the schedules completed, the next step is the "break-down," or allocation, of the factory overheads to departments and cost centres. In the early days of cost accounting in this country it was a common occurrence for factory overheads to be recovered, as a production cost, by what was known as a blanket rate on wages cost. That is, the total estimated factory overhead charges were expressed as a percentage of total estimated direct labour charges; subsequently, this percentage was added to the direct labour cost of each order on the supposition that the overheads had been incurred in direct ratio to that direct labour cost.

This supposition was manifestly wrong. Each item of factory overheads cannot be thus submerged in a total blanket rate; instead, specific consideration must be given to each item, and the disposition of the charge made more scientifically. This approach to the problem resulted, initially, in a departmentalisation of factory overheads. Thus, for example, factory rent and rates were allocated on the basis of the floor space in each department. Cost of electric lighting could be definitely allocated where a meter existed in each department, but if one meter only recorded total consumption, the lighting cost could be "spread" on the basis of lighting points in each department. Depreciation of plant and machinery could be properly earmarked to departments if adequate records of plant and machinery purchased were maintained in a Plant Register.

Cost Centres

Departmentalisation of factory overheads was thus an early, but progressive, step towards a more enlightened treatment of factory overheads in general. But it became gradually apparent that even this application was not sufficiently far-reaching. For example, a department might house both expensive and relatively inexpensive plant. Article A might be produced on the inexpensive plant, and Article B on the expensive plant, and while labour and materials costs could conceivably be identical and the processing times similar, the application of a departmental overheads' rate would be inequitable, inasmuch as the production on the inexpensive plant would be burdened with the same amount of overheads as that on the expensive plant. Hence, continuous thought given to these problems has led to the distribution of factory overheads to what are known as Cost Centres. A Cost Centre may be:

(*a*) a specific machine in the department;
(*b*) a group of similar machines in the department; or
(*c*) a group of similar machines which is not located in one department but housed, instead, in several departments.

This conception of Cost Centre overheads has led to the close individual allocation of each separate item forming the generic body of overheads. Thus the charge is not now allocated to the department, but to the machine or group of related machines. In certain instances there will be a non-mechanised department, and in this case the allocation of relevant charges will be to the department specifically.

It is the Cost Accountant's function, therefore, to ensure that the factory overheads are equitably distributed to Cost Centres (in mechanised departments), and to departments (where non-mechanised). Various bases of distribution have been already discussed, *i.e.* floor space (for rent and rates), metered consumption of electric lighting and power, metered consumption of steam, and depreciation (based on plant values). The cost incurred in wages of foremen and chargehands can,

initially, be readily analysed to departments. Within each department a reasonable basis of distribution to the Cost Centre is on the number of direct labour operatives in each Cost Centre. Costs of plant maintenance and consumable stores are readily ascertainable from pay-roll and materials analyses. Where power is not metered to each machine, the distribution of the charge should be made after consultation with the plant engineer. Horse-power of each machine multiplied by estimated running hours will frequently provide a reasonable basis. Supervisory salaries can be allocated on the basis of direct labour costs plus plant values, for executive supervision in the factory is not directed solely to operatives, but is also greatly concerned with the best usage of costly plant and machinery. The costs of the Personnel Department, Welfare Department, and Canteen operations are effectively distributed on the basis of the number of employees in each department. This basis will, however, result in charges to Production and Service Departments respectively, and that amount borne by the Service Departments must, in turn, be re-allocated to Production Departments on some equitable basis such as number of employees in Production Departments or estimated benefit derived from Service Departments.

Machine-hour Rates

With the factory overheads distributed to Cost Centres, it is now possible to obtain a machine-hour rate in respect of each Cost Centre. This is achieved by computing the estimated annual running hours of a specific machine, or group of machines, and dividing such hours into the total overheads charge applicable to the Cost Centre, to arrive at an hourly rate.

Accurate recording of production now ensues on time-sheets and other production records, and the hours on each Cost Centre are evaluated at the appropriate Cost Centre rate to give the applicable overheads charge.

Standing order numbers should provide a distinctive numerical code reference to each machine, process, service (*i.e.* steam production, plant maintenance), expense item, and type of material within a Cost Centre. This tends to ensure that proper designation is given, on production records, to type of process, material, and Cost Centre, leading to proper recording and analysis of costs; likewise with the costs of the various ancillary services.

Administration overheads may be recovered on a percentage basis, *i.e.* the percentage borne by administrative charges to total estimated factory cost. It is evident that the Cost Centre mode of distribution cannot be applied to these charges; they are incurred in the general administration of the company, and any attempted "spreading" of the total administrative charges over factory operations would be arbitrary in the extreme.

Selling and distribution charges are specifically incurred in disposing of the finished products. Analysis of the constituent expense items under this heading may reveal that certain of such items can be allocated to specific "lines," for example advertising and commission, where such is graded according to a product classification. Where this situation obtains, the selling and distribution charges capable of being directly allocated should be so treated. The residue of total selling expense must be then recovered as a percentage on sales value.

(*To be continued*)

Parts I and II of this series were published in the December, 1947, and February, 1948, issues.

Fruit and Vegetable Preservation

FRUIT and vegetables preserved by freezing are gaining rapidly in popularity with consumers, and manufacturers will be interested in a recently published booklet* giving all the most up-to-date scientifically proved facts on the freezing of fruit and vegetables.

Superseding the 1937 edition, which has been largely rewritten and brought up to date, this booklet is based on nearly twenty years of laboratory and research experience, and is intended to give guidance to those wishing to preserve fruit and vegetables by freezing.

Since 1937 it has become increasingly evident that storage at 0° F. −5° F., rather than at 14° F., is necessary if really reliable products of the highest possible quality are to be obtained. This is more important than extreme rapidity of freezing, except for a few vegetables such as asparagus, where a definite degree of firmness of texture is required.

After a brief section on the principles of preservation by freezing, the booklet deals with practical details of the methods to be employed both for fruit and vegetables. Such details as types of plant and equipment, packaging, stowage, storage taints, and the wholesomeness of frozen foods are included. A table shows that raspberries, currants, gooseberries, strawberries, runner beans, spinach, and asparagus can be stored for a year at −4° F. and be in excellent condition at the end.

* *Food Investigation Leaflet No. 2. The Preservation of Fruit and Vegetables by Freezing.* Pp. 12. H.M.S.O. Price 4d. net.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Concentration by Freezing of Fruit Juices, Vinegars, and Ciders

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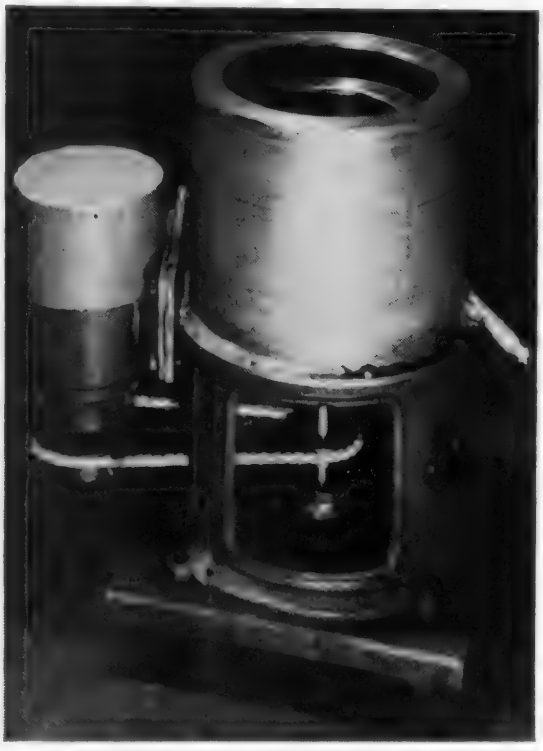
The merits of concentration by freezing have already been discussed and the basic data published for coffee[1] and beer.[2] Beer apparently cannot be concentrated beyond 18 per cent. V/V of alcohol without the loss of some essential flavouring constituents which separate out during freezing at temperatures below about −10° C. Constituents in coffee appear to form a cryohydrate at about −10° C., and this limits the concentration which can be obtained by freezing to about 38 per cent. of solids. The data in this article show the extent to which fruit juices, vinegars, and ciders can be concentrated at temperatures down to about −20° C.

NO critical study of the quality and keeping properties of the concentrates has been made. To the non-expert palates the concentrates, excepting those from carbonated liquids, when diluted down to the strength of the original liquid, show only a very slight loss of bouquet. Carbonated liquids lose carbon dioxide during freezing and, consequently, are flat on dilution.



Centrifuge with stainless steel basket used to separate ice and concentrate in freezing liquids.

As the concentration of the liquids is increased it is to be expected that some constituents will be thrown out of solution either immediately or on standing, especially from those liquids which contain alcohol or acetic acid. Thus in the concentrated Burton-type beers a non-dispersible deposit, possibly consisting of protein-dextrin complexes, formed on standing when the alcohol content was greater than 18 per cent. V/V and this resulted in a loss in flavour. In malt vinegars the deposit appears to be a mineral one (calcium phosphate)[3] and remains insoluble on dilution. In apple juice, concentrated to about 60 per cent. solids, the deposit which sometimes forms is in the nature of a hemicellulose and is not redissolved on dilution.

The need for such concentrates will not be discussed here, but the advantages arising from a reduction in volume for transport or storage are obvious, and it is not unlikely that some of the concentrates would prove novel and useful products.

Fruit Juice Concentrations

The apple juices were prepared by mincing the fruit and leaving the pulp overnight at ordinary temperature after adding 0·2 per cent. of Pectinol. Next day it was pressed in a small hydraulic press, maximum loading 20 lb./sq. in., and the juice obtained was treated with 0·2 per cent. Pectinol. After standing overnight the juice was sufficiently clear to be siphoned off the deposit, after which it was filtered through kieselguhr. Strawberry juice was treated similarly. To prepare plum juice the fruit was first cooked with a quarter of its weight of water, put through a brush-sieve to remove skin and stones, and the pulp cooled down to room temperature. The sieved pulp was treated with Pectinol in the same way as apple pulp and the juice treated again after pressing, when it was left overnight to clear. There was considerable difficulty in filtering plum juices, presumably due to the

presence of gummy substances, and the kieselguhr bed had to be changed frequently.

Vinegars and Ciders

The vinegars, ciders, etc., used were the commercial products supplied by the makers and received no pre-treatment.

The liquids were placed in constant-temperature rooms at temperatures of −3° C., −7° C., −10° C., and −20° C., and stirred at intervals as freezing occurred. When the mass had reached the required temperature the ice and concentrate were separated at ordinary temperature by means of a basket-type centrifuge, provided with a basket and outer casing of stainless steel, and developing an acceleration of 800 G. When working with a charge of about 10 lb. it was necessary to hold the maximum speed for about one minute.

To get the highest concentration from dilute liquids, *e.g.* malt vinegar, it was necessary to carry out the process in two or more stages because of the difficulty in removing the liquid from such relatively large quantities of ice as would be obtained if the concentration were attempted in one stage.

In these experiments the liquids were usually frozen in 1 gal. lots, taking from two to seven days, depending on the amount of ice that had to separate out; they were usually stirred at least once during freezing and the mass was again broken up before it was centrifuged. When using larger containers—5 gal. capacity—stirring was more frequent, helping both to speed up the rate of freezing and to produce ice crystals of uniform size.

The centrifuging was carried out in the laboratory at ordinary temperatures, but the heavy steel basket was pre-cooled before receiving the first

TABLE 1.

PROPERTIES OF CONCENTRATED FRUIT JUICES.

	Times Concentrated.	*Freezing Point ° C.*	*Total Solids (g. per 100 g. Juice).*	*Refractive Index.*	*Specific Gravity.*	*Acidity ml. N NaOH per 100 g.*	*Sugar. Total. g. per 100 g.*	*Sugar. Hexoses. g. per 100 g.*
Apple Juice (Charles Ross):								
Original	1·00	−1·40	12·25	1·3505	1·039			
Concentrate I	2·10	−3·65	26·15	1·3715	1·089			
II	2·60	−4·95	31·85	1·3810	1·112			
III	3·20	−6·55	38·80	1·3913	1·159			
IV	3·85	−9·60	47·00	1·4073	1·200			
V	4·30	−11·15	52·40	1·4130	1·217			
VI	5·15	−17·35	63·00	1·4337	1·272			
Apple Juice (Bramley's Seedling):								
Original	1·00	−1·30	10·80	1·3498	1·046			
Concentrate I	3·00	−5·00	32·65	1·3830	1·124			
II	3·75	−7·00	40·65	1·3977	1·176			
III	4·40	−9·60	47·60	1·4093	1·212			
IV	4·85	−11·35	52·50	1·4164	1·232			
V	5·90	−18·60	63·70	1·4393	1·295			
Blackcurrant Juice A:								
Original	1·00	−1·95	13·50	1·3530	1·058			
Concentrate I	1·90	−4·65	25·40	1·3740	1·117			
II	3·00	−9·10	40·40	1·4020	1·190			
III	4·00	−16·02	53·90	1·4270	1·266	219·0	28·7	28·20
Blackcurrant Juice B:								
Original	1·00	−1·95	12·75	1·3530	1·051	55·6	6·1	5·96
Concentrate I	2·65	−7·65	33·80	1·3880	1·157			
II	4·00	−16·40	51·30	1·4240	1·250	204·0	26·9	25·70
Damson (Merryweather):								
Original	1·00	−1·20	11·20	—	—			
Concentrate	5·90	−18·00	65·60	—	—			
Plum (Early Rivers):								
Original	1·00	−1·65	14·10	1·3535	1·056			
Concentrate I	1·40	−2·46	20·00	1·3632	1·087			
II	1·80	−3·45	25·70	1·3723	1·109			
III	2·20	−4·48	30·60	1·3820	1·135			
IV	2·60	−5·90	36·20	1·3913	1·162			
V	3·40	−9·80	48·40	1·4127	1·217			
VI	4·00	−13·20	56·00	1·4273	1·256			
VII	4·50	−18·00	63·00	1·4395	1·292			
Strawberry (Brenda Gautrey):								
Original	1·00	−0·63	5·80	—	—			
Concentrate I	2·70	−1·95	15·70	—	—			
II	9·70	−14·00	56·50	—	—			

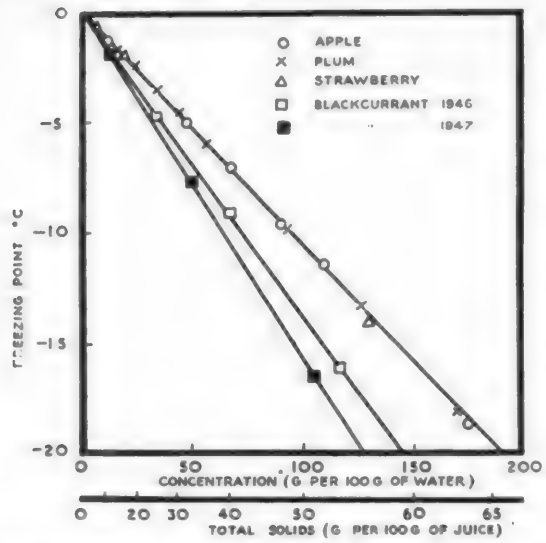


Fig. 1. Freezing points of fruit juices.

charge, after which it was emptied out and used straight away for the next run.

Test with Tarragon Vinegar

In one test with Tarragon vinegar, frozen in 1 gal. lots, the quantities handled were as follows:

29 lb. 8 oz. of vinegar (5·75 per cent. acetic acid) were frozen at a temperature of −10° C. (14° F.). After centrifuging, 11 lb. 8 oz. of concentrate I containing 14·52 per cent. acetic acid were obtained, and 16 lb. 13 oz. of ice which, after thawing, was found to contain 0·27 per cent. of acetic acid. A sample of concentrate I was retained for analysis, and the remainder, 9 lb. 6 oz., was then frozen at a temperature of −18° C. (0° F.). After centrifuging again there were 4 lb. 2 oz. of concentrate II containing 31·7 per cent. acetic acid. The ice from this separation was allowed to thaw slightly, well stirred, and recentrifuged, when 2 lb. 0 oz. of liquid were recovered, containing 3·75 per cent. of acetic acid. The residual ice (2 lb. 10 oz.) on thawing was found to contain 0·07 per cent. of acetic acid.

TABLE 2.

PROPERTIES OF CONCENTRATED VINEGAR.

	Times Concentrated.	*Freezing Point ° C.*	*Total Solids (g. per 100 g. of Vinegar).*	*Refractive Index.*	*Specific Gravity.*	*Acetic Acid (g. per 100 g.).*	*Ratio Acetic Acid Total Solids.*
Spirit Vinegar:							
Original	1·0	−3·320		1·3413	1·0155	10·20	—
Concentrate I	1·5	−5·350		1·3470	1·0230	15·40	—
II	2·9	−10·700		1·3548	1·0420	28·40	—
III	4·8	−19·200	0·80	1·3660	1·0950	45·20	—
Malt Vinegar A:							
Original	1·0	−1·920	2·13	1·3395	1·0140	5·00	2·35
Concentrate I	1·9	−3·950	4·39	1·3456	1·0260	9·30	2·12
II	4·0	−9·270	8·50	1·3590	1·0530	19·20	2·26
III	7·2	−18·630	14·40	1·3784	1·0930	33·10	2·30
Malt Vinegar B:							
Original	1·0	−2·630	2·50	1·3420	1·0170	7·05	2·82
Concentrate I	2·2	−6·150	5·44	1·3513	1·0380	15·00	2·76
II	3·2	−9·750	7·85	1·3593	1·0540	22·00	2·80
III	5·5	−18·450	13·31	1·3760	1·0860	36·20	2·72
Malt Vinegar C:							
Original	1·0	−1·700	2·01	—	1·0130	4·35	2·16
Concentrate I	3·4	−6·450	6·68	—	1·0420	14·40	2·16
II	6·9	−15·060	14·14	—	1·0860	28·10	1·99
Tarragon Vinegar:							
Original	1·0	−2·320	3·39	—	1·0210	5·62	1·66
Concentrate I	2·5	−6·560	7·73	—	1·0500	13·80	1·79
II	5·5	−16·200	15·85	—	1·0980	28·90	1·82
Dextrose in acetic acid solutions to simulate freezing point/concentration relations of Malt Vinegar A ..		−1·960	*		1·0200	4·96	1·67
		−4·070			1·0370	9·65	—
		−9·080			1·0710	18·70	—
		−19·000			1·1210	32·30	—
Acetic acid solution† ..		−0·514				1·63	
		−2·088				6·50	
		−3·910				11·84	
		−6·920				20·28	
		−10·870				30·10	
		−15·900				41·60	

* Total solids as dextrose = 60 per cent. by weight of acetic acid present.
† Landolt Börnstein **2**, 1443.

TABLE 3.

PROPERTIES OF CONCENTRATED CIDER AND STOUT.

	Times Concentrated.	Freezing Point ° C.	Total Solids (g. per 100 g. of Material).	Refractive Index.	Specific Gravity.	Alcohol V/V Per Cent.	Titratable Acidity ml. N NaOH per 100 g.	Ratio Alcohol Total Solids.
Cider A (Dry):								
Original	1·0	−2·72	2·22	1·3404	1·0001	6·45	8·50	2·90
Concentrate I ..	1·6	−4·78	3·74	1·3450	1·0009	10·60	13·20	2·83
II ..	2·8	−9·42	6·08	1·3530	1·0036	17·90	22·20	2·95
III ..	4·1	−18·75	10·82	1·3650	1·0113	26·30	38·60	2·43
Cider B (Dry):								
Original	1·0	−2·33	2·00	1·3404	1·0007	5·45	7·30	2·73
Concentrate I ..	1·7	−4·34	3·50	1·3442	1·0021	9·35	12·60	2·67
II ..	3·2	−9·35	6·40	1·3530	1·0057	17·30	23·10	2·70
III ..	4·7	−18·43	10·55	1·3644	1·0086	25·50	38·20	2·42
Cider C (Dry):								
Original	1·0	−2·05	3·20	1·3400	1·0066	4·50	6·55	1·41
Concentrate I ..	1·8	−4·20	6·10	1·3470	1·0134	8·00	12·25	1·31
II ..	3·7	−11·45	12·95	1·3622	1·0303	16·80	27·00	1·30
III ..	5·3	−18·92	17·80	1·3730	1·0407	24·10	35·90	1·35
Cider D (Dry):								
Original	1·0	−2·35	2·48	1·3400	1·0020	6·00		2·42
Concentrate I ..	1·9	−5·20	4·94	1·3460	1·0050	11·70		2·37
II ..	4·0	−17·90	10·60	1·3660	1·0160	29·40		2·77
Cider E (Sweet):								
Original	1·0	−2·02	6·07	1·3437	—	3·80		0·63
Concentrate I ..	3·1	−9·65	21·00	1·3695	—	11·70		0·56
II ..	4·8	−17·00	29·70	1·3845	—	18·30		0·62
Stout (Oatmeal):								
Original	1·0	−1·25	3·87	1·3400	1·0110	2·90		0·75
Concentrate I ..	4·2	−6·64	16·80	1·3630	1·0490	12·10		0·72
II ..	7·4	−16·35	29·50	1·3880	1·0970	21·55		0·73
*Alcohol Solutions** ..		−0·94				2·90		
		−1·92				5·68		
		−4·00				11·03		
		−8·06				19·50		
		−14·66				28·50		
		−25·70				40·87		

* *J. Amer. Chem. Soc.*, **56**, 874, 1934.

Data obtained from examination of the various concentrates are given in Tables 1, 2, and 3.

The refractive index was read off directly with a Zeiss refractometer which also had a "sugar" scale, readings of which gave an indication of the solids content. Specific gravities were determined in a specific-gravity bottle against water at 15° C.

Total solids, *i.e.* dry weights, were determined by evaporating a known weight to dryness and drying off the residue in an oven at 100° C. for thirty minutes. To make the observations strictly comparable, but not necessarily absolute, they were made simultaneously on all the samples of any one material. The quantities of liquid, weighed into 40 ml. porcelain dishes, were chosen so as to yield the same amount of dry matter and, to ensure that the dry "stains" were the same size, water was added to bring the concentrates to the same volume in every case.

Acid content was determined by titration with standard alkali to *p*H 8·3, using phenolphthalein or, for coloured solutions, a glass electrode.

Alcohol contents were estimated from the density of a distillate obtained under standard conditions.

The vitamin analyses were made by Drs. Mapson and Kodiček of the Dunn Nutritional Laboratory, Cambridge, and Dr. Pollard of Long Ashton Research Station.

As shown by Figs. 1, 2, and 3, the three classes of liquids behave differently, with a fairly wide variation between different specimens in each class.

Fruit Juice Experiments

When the concentration/freezing point data for fruit juices (Table 1) are plotted there results a series of straight lines if concentrations are expressed as g. solute per 100 g. water as in Fig. 1. The juices, in fact, concentrate as if they were solutions of non-dissociating solutes with a molecular weight of about 180, but no significance is attached to this, and it is considered fortuitous that several fruit juices have the same concentration/freezing point data.

Thus, the concentrates from Bramley's Seedling and Charles Ross apples, Early Rivers plums, and Brenda Gautrey strawberries all contained about

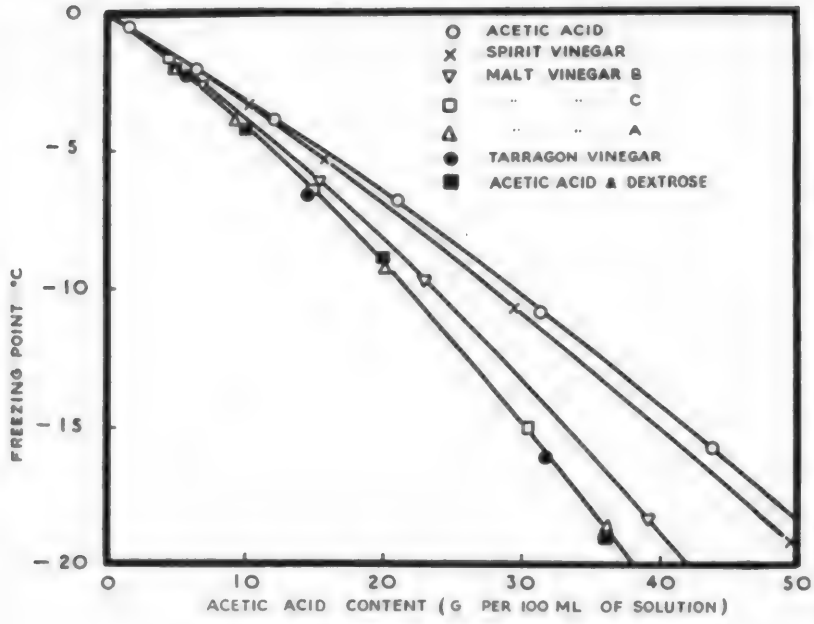


Fig. 2. Freezing points of acetic acid solutions.

as the sugar content. It is unlikely, however, that this effect was the sole cause of the difference in behaviour between the two samples.

The concentration of ascorbic acid in blackcurrant juice apparently proceeds more rapidly than that of the other solutes during freezing, and analytical data are consistent with one or other of two alternatives: either the ascorbic acid disappears quite rapidly in the unconcentrated juices, unless protected by suitable means, or some solutes other than ascorbic acid are removed from the juice by freezing. It was quite clear, however, that the concentrates, as prepared, were very rich in ascorbic acid.

the same percentage of solids at any given temperature of freezing down to −20° C. This was also nearly true of damson concentrates but not of the two samples of blackcurrant juice tested, which behaved somewhat differently both from each other and from the other juices. This may have been due partly to the method of preparation and partly to a difference in composition, the latter probably being the more important factor.

A small amount of crystalline deposit, probably acid calcium malate, formed in some of the concentrated damson juice on standing, would affect very slightly both the freezing point and the solids content of the concentrate, as the determinations were made after the deposit had formed. This could also occur more rapidly at the time of freezing, when the deposited material would be removed with the ice by centrifugal separation without being noticed, and that something of this sort happened with the juice of blackcurrants is indicated by the analyses, which showed that the acid concentration did not increase to the same extent

Vinegar Experiments

As would be expected, the concentration/freezing point data in Table 2, for concentrates prepared from vinegar, differ from those for acetic acid and water to an extent depending on the amount of other solutes present. Thus, spirit vinegar, which contains very little soluble material other than acetic acid, behaves almost exactly like acetic acid and water, whereas with malt vinegars the amount of acid is less than would be expected. The freezing point/acid concentration data for malt vinegar

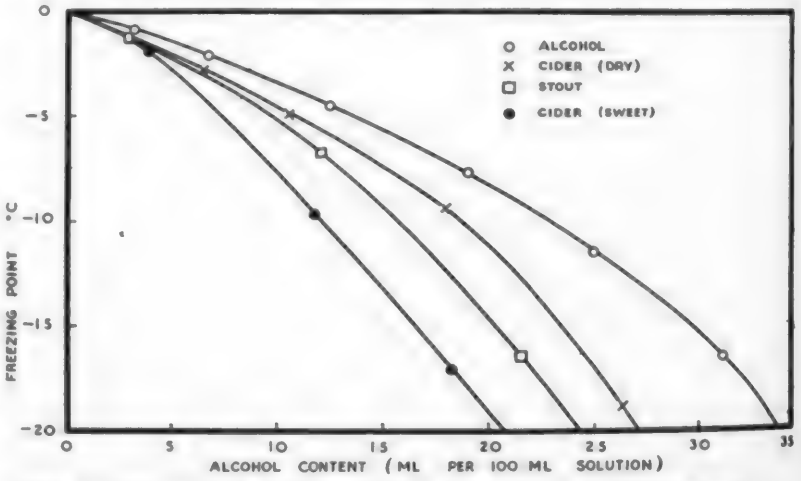


Fig. 3. Freezing points of alcohol solutions and beverages containing alcohol.

TABLE 4.

VITAMIN CONTENT OF CONCENTRATED VINEGAR AND OF BLACKCURRANT JUICE.

Malt Vinegar B:	*Acetic Acid (g. per 100 ml.).*	*Vitamin B_1 µg./ml.*	*Nicotinic Acid µg./ml.*	*Riboflavin µg./ml.*
Original Vinegar	7·16	0·26	8·9	0·10
Concentrate III	39·30	1·43	43·5	0·51
Concentration ratio	5·50	5·50	4·9	5·10

	Total Solids g. per 100 g. Juice.	*Ascorbic Acid mg. per g.* (1)	(2)	*Concentration Ratios. Total Solids.*	*Ascorbic Acid.*
Blackcurrant Juice A:					
Original juice	13·50	1·13	1·37	1·00	1·00
Concentrate I	25·40	2·33	2·69	1·90	2·05
II	40·40	4·83	4·73	3·00	4·30
III	53·90	6·55	6·56	4·00	5·80
Blackcurrant Juice B:					
Original juice	12·75	1·14		1·00	1·00
Concentrate I	33·80	3·63		2·65	3·20
II	51·30	6·34		4·00	5·60

A can be reproduced almost exactly by solutions of acetic acid and dextrose in the ratio of 1 to 1·67.

Throughout the temperature range studied there does not appear to be any marked change in the ratio of acetic acid to total solids in any of the vinegar concentrates, from which it follows that all the substances present in vinegar are concentrated to the same extent, even the small quantities of vitamin present (Table 4).

In solutions which contain either alcohol or acetic acid there is, as concentration proceeds, an increase in the proportion of alcohol or acetic acid to water, and substances which may be soluble in the dilute solution are not necessarily soluble in the more concentrated solutions. This might account for the deposit of calcium phosphate formed slowly in the concentrates prepared from malt vinegar and for the flocculent deposit, presumably a tannin-protein-dextrin complex, which forms in concentrated beers. Any such loss of solutes is undesirable because they may either be substances responsible for taste and flavour or may adsorb such substances during deposition. It is unlikely, however, that the mineral deposit which forms in malt vinegars has these properties as only a slight deterioration in quality was observed on dilution.

Alcoholic Liquids

With beer concentrates the situation is quite different and the flocculent deposit which may form on standing certainly does carry down substances which influence flavour to a great extent.

Concentrates prepared from various types of cider remain clear and free from haze or precipitates if the cider from which they are prepared is clear and bright.

Ciders show great variation in composition, particularly in the ratio of alcohol to sugar, which affects the degree of concentration obtained by freezing (Table 3). Those with a low sugar content concentrate further at a given temperature of freezing than those with a high sugar content (Fig. 3).

The fruit juices and concentrates were prepared by Mrs. Sharman and Mr. R. Norman. The determinations, other than vitamin assays, were made by Mr. H. J. Shepherd.

The work reported above formed part of the programme of the Food Investigation Board of the Department of Scientific and Industrial Research.

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1. R. Gane, The Concentration of Coffee Extracts by Freezing, *Food Manufacture*, 1946, **21**, 510-524.
2. R. E. Essery, R. Gane, and T. N. Morris, The Concentration of Beer by Freezing, *J. Inst. of Brewing*, 1947, LIII, 204-208.
3. J. C. Morpeth, British Food Manufacturing Industries Research Association, Private communication.

Anniversary Dinner

IN commemoration of the twenty-fifth anniversary of the formation of Leonard Hill Limited, Mr. and Mrs. Hill entertained the staff and guests at a dinner at the Trocadero Restaurant on May 25.

The toast "Mr. and Mrs. Leonard Hill, coupled with Leonard Hill Limited," was proposed by Lord Trefgarne, to which Mr. Hill replied.

Dr. L. H. Lampitt proposed the toast "FOOD MANUFACTURE," supported by Dr. D. W. Kent-Jones, Mr. Hill replying. Other toasts were "The Guests" (proposed by Mr. Hill and replied to by Sir Edgar Jones), and "The Ladies," proposed by Mr. C. W. Berry. Mrs. Hill, in a charming little speech, responded.

During the evening the guests were entertained by well-known artistes.

In addition to the staff, the following guests were present: Lord Trefgarne, Sir Edgar Jones, Dr. M. A. H. Tincker, J. Bertram Ward, W. J. Brittain, Dr. L. H. Lampitt, Dr. D. W. Kent-Jones, Prof. D. M. Newitt, Dr. J. G. Davis, T. H. Fairbrother, N. Barraclough, C. Spalding, N. Kitcat, Dr. J. H. Martin, C. W. Berry, E. Hallows, Miss D. Dovell. D. McCleery, Mrs. J. Lane, H. Dawson, S. L. Dyer, A. Hughes, and J. Cuka.

News from the Industry

FORTHCOMING EVENTS

Ethiopian Arts

Vegetable oils and other food products will be featured at an exhibition of Ethiopian arts and industries, to be held at the showrooms of the Co-operative Wholesale Society, Ltd., Leman Street, London, E.1, from July 12 to 17, 1948.

The Engineering and Marine Exhibition, 1949

Following the success of the 1947 Engineering and Marine Exhibition, the organisers, F. W. Bridges and Sons, Ltd., announce that they have now been able to secure the whole of Olympia for their next exhibition, which will be held from August 25 to September 10, 1949.

Mechanical Handling Exhibition

Modern methods of handling materials in ten industries will be discussed at the Mechanical Handling Exhibition and Convention to be held at Olympia from July 12 to 21, when sixteen papers will be presented by leading authorities.

Royal Institute of Chemistry

The remaining fixtures for the summer programme of the Royal Institute of Chemistry of Great Britain and Ireland, London and South-eastern Counties Section, are as follows:

June 15. 2.30 p.m.: Visit to the National Institute for Research in Dairying, Shinfield, near Reading.

Date not fixed. Two-day trip to the whale factory ship *Southern Venturer* or *Southern Harvester*, at South Shields.

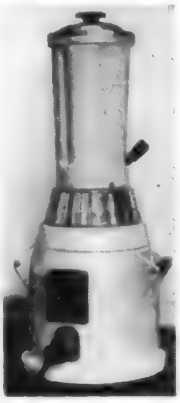
July 8. 2.15 p.m.: Visit to Tate and Lyle, Ltd., Thames Refinery, Silvertown, E.16.

July 13. 2.15 p.m.: Visit to Fuel Research Station, Blackwall Lane, East Greenwich, S.E.10.

July 17. Afternoon: Visit to Wye College, Wye, near Ashford, Kent.

July 21. 2.15 p.m.: Visit to Pharmaceutical Specialities (May and Baker), Ltd., Dagenham, Essex.

Homogenisers and Emulsifiers



Manufactured in two sizes, 1 litre and 5 litre, the Turmix homogeniser has been brought to this country from Switzerland and is being made in large quantities under licence for sale at home and throughout the Commonwealth. Forty litre and 200 litre machines are also being developed, all fully covered by recent patents for the new cutting knives and mixing devices.

Among many uses the Turmix can be employed in laboratories for the preparation of emulsions, for pulverising and mixing herbs, and for preparing triturations and blending dusting powder; and in the dairy industry for making butter and special soft quality cheese.

One of the selling agents in this country is the Crittall Kitchen Equipment Co., Ltd., a member of the Richard Crittall group.

Stainless-clad Steel

An important development in the food industry is the creation of a stainless-clad steel. Its main virtues are that it offers all the protection of stainless steel at approximately 75 per cent. of the cost. This development follows similar trends in the timber and metal industries, in that lamination is adopted to give qualities which are lacking in the constituent sections. According to information available the method of production involves the preparation of stainless slabs and normal boiler plate quality steel in sandwich form of appropriate thicknesses. The sandwich is then heated and rolled to give a permanently bonded boiler plate steel with a thin veneer of stainless steel. The stainless veneer resists corrosion while the boiler plate section is sufficiently strong to give workability and backbone to the bonded unit. It is indicated that the technique so devised can be utilised not only to bond stainless to boiler plate but to bond steels which have been previously regarded as not normally capable of adhesion.

Charles Henry Foyle Trust

Since the end of the financial year in May, 1947, but before the sixth report could be printed, the death occurred of Charles Henry Foyle, the founder of the Trust.

The Trust was founded as a result of Mr. Foyle's interest in education and social work and his understanding of the community's need to have funds for work of an unusual or pioneer character for which public money would not normally be available. In 1940 he transferred to five trustees 7,500 Ordinary shares in Boxfoldia, Ltd. (half his total holding of Ordinary shares in the company), a gift at that time worth approximately £50,000, and an undertaking was given that there should be no further issue of these shares which would reduce the value of the Trust's holding below this figure.

The gross income for the year covered by the report was £5,497. Since the inception of the Trust over £18,000 has been distributed and the value of the Trust investments is now about £100,000.

Fluorescent Lighting Fittings

A new range of fluorescent lighting fittings, designed to combine appearance and comfortable seeing with high efficiency and easy maintenance, is being introduced by Crompton Parkinson, Ltd.

All exterior metal work of the four available types is enamelled to a satin aluminium finish, with internal reflector enamelled white. All control gear is carried in the body of the fitting.

Electronic Relay

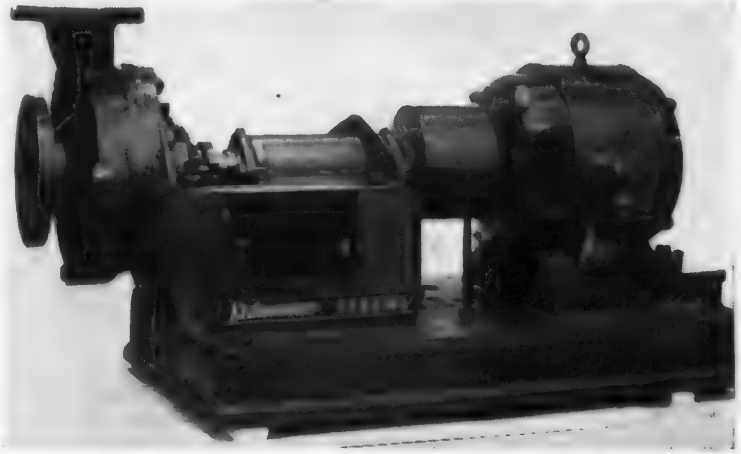
A relay using only a few microwatts has been developed for use with light contact instruments by Sunvic Controls, Ltd.

Company News

The formation of a new company, Tanganyika Packers, Ltd., which has been constituted in Tanganyika in association with the Government of that territory with the object of building and equipping a new factory to be sited in the vicinity of Dar-es-Salaam, was announced at the eighty-third ordinary general meeting of Liebig's Extract of Meat Co., Ltd., Mr. Kenneth M. Carlisle, chairman and managing director, presiding. The appointment of Mr. William J. Gunther as a director of the company was also announced. Speaking of the profits and dividends Mr. Carlisle said that after payment of the final dividend of 7s. recommended, there would remain to be carried forward to the new account the sum of £191,000 against £190,000 brought in.

*

At the thirty-fifth annual general meeting of the United Glass Bottle Manufacturers, Ltd., a final dividend of 10 per cent. on the Ordinary capital for the year, but eliminating the cash bonus, was announced, thus making a similar total distribution on the Ordinary capital to that of last year.



Centrifugal pump suitable for pumping liquids at temperatures up to 650° F.

Hot Liquid Pumps

Covering a range of duties up to 3,000 gal. per minute with working pressures up to 300 lb. per sq. in. and corresponding hydraulic test pressure of 450 lb. per sq. in., two special "JA" and "JB" type pumps produced by the Pulsometer Engineering Co., Ltd., are capable of withstanding water temperatures up to 400° F. and, with modifications to the design, can also handle oils having a high vapour pressure at temperatures up to 650° F.

Gland trouble is reduced to a minimum by mounting the impeller overhung on a wide diameter shaft, so that only one gland is necessary, and water-cooled bearings and stuffing boxes are also provided, while centre line suspension is adopted to preserve alignment at varying temperatures.

The casing and back cover of the pump are made in cast steel, although for some conditions other metals may be used, and the impeller is hydraulically balanced.

Hot liquids up to 212° F. containing acids, with the exception of hydrofluoric acid, can also be dealt with by a stoneware centrifugal pump, which is a joint production with Doultons, Ltd.

A delivery van with a Dodge 2 to 3 ton chassis. The body has a loading space of 470 cu. ft.

Commercial Vehicles

Powered by a six-cylinder engine, the range of vehicles produced by Dodge Bros. (Britain), Ltd., comprises five distinct models of varying wheelbase lengths with load capacities ranging from 2 to 6 tons. The 2 to 3 ton model has a maximum gross laden weight of 110 cwt. and is eminently suitable for use as a delivery van or dropside lorry. An interesting feature of this model is the fitting of a hypoid rear axle.

Screw Caps

The increasing demand for aluminium screw caps is being met by Tinpacks, Ltd. Some sizes of caps up to 28 mm. are now ready. It is hoped soon to have a complete range in tinplate and bakelite, so far as supplies permit.

The supply of lever lids, tablet boxes, etc., is still limited and the company is making every effort to meet the demand for this type of goods.

Containers for the Food Industry

The supply of composite canisters and drums as used in the food trade is now being undertaken by Percenta, Ltd.

Canning in Egypt

OPERATIVES TO BE TRAINED IN ENGLAND

Reading from left to right: Abdallah Bey Abaza, U.S.S. Ministry of Commerce and Industry; Mr. W. V. Smedley; H.E. Ahmed Abdel Ghaffar Pasha, Minister of Agriculture; Mr. S. W. Smedley; H.E. Mamdouh Riaz Bey, Minister of Commerce and Industry; H.E. Khairy Pasha.

At the invitation of H. E. Khairy Pasha, a cousin of the King of Egypt, Mr. S. W. Smedley has recently visited Egypt to look over plantations and advise as to the possibilities of canning such fruits as tomatoes, strawberries, bananas, grapefruit, and oranges. The prospects seem to be good as crops are available for nine months of the year, many varieties producing three crops a year, and fruit and labour are cheap. The only drawback to an early start is the lack of tinplate.

In the meantime plant is already in the course of production by British manufacturers, and two men are being sent over for training in Mr. Smedley's factories. Mr. Smedley has also been asked to provide the executive staff to run the factory.

Prevention of Steam Losses

The method of sealing leaks in the joints and flanges of steam pipes by the Furmanite process enables repairs to be carried out to the plant without stoppage. A semi-plastic solid prepared in cartridge form which, when heated above the temperature of boiling water, melts and can be squeezed by means of an injector gun into the smallest aperture, Furmanite also has the property of being subject to vulcanisation under heat, forming a hard elastic and permanent packing. The method makes possible a metal to metal joint without having to polish the faces, it being necessary only to turn a shallow groove or grooves connecting with bolt holes, bolt the two flanges together, and force the compound down one of the bolts.

Detergents, Wetting, and Emulsifying Agents

A paper on the development of synthetic detergents and future trends read by F. H. Braybrook, M.A., F.Inst.P., formed part of the symposium on detergents, wetting, and emulsifying agents held under the auspices of the London section of the Society of Chemical Industry.

The development of synthetic detergents was reviewed against the background of the overall detergent field so far dominated by soap. Synthetic detergents were initially manufactured in relatively small quantities from fatty raw materials, mainly as speciality products for the textile industry; but their high cost of production hindered them from competing directly with soap for the bulk market.

During World War II, synthetic detergents were made on a greatly increased scale, mainly from non-fatty sources. In the U.S.A. and Britain, petroleum was the principal source of raw material, and in Germany, synthetic Fischer-Tropsch oils.

By the end of the war the widespread usage of synthetics had focused attention on their special merits, and this, coupled with cheaper production from non-fatty materials, opened the way for their future in the bulk detergent market.

For the future it is envisaged that the short-range importance of synthetic detergents during the period of fat shortage will be followed by a period of increasing demands for synthetic detergents consequent upon their technical and economic merits, and broadly speaking, related to improving standards of living. Future developments will be influenced mainly by the need for efficient utilisation of available fats in relation to consumer requirements for edible and industrial purposes.

Oil-seed cultivation is a long-term plan, and will be insufficient in itself to satisfy requirements. By contrast, the petroleum industry provides a readily available, abundant, and comparatively cheap source of raw material which can be speedily and efficiently converted to detergents by modern petroleum refining methods. Present trends in synthetic detergent manufacture indicate a tentative world ceiling production of two million tons per annum, and the petroleum chemical industry provides a logical source for supplies of this magnitude.

Overseas Visit

Mr. J. N. Watson, engineer and sales manager of the Refrigeration Department of G. and J. Weir, Ltd., is on a visit to overseas agents in the Middle East. He will also visit the Soudan, East Africa, and South Africa to arrange with local firms for exclusive agencies for Weir refrigerating machinery. South African firms who wish to contact Mr. Watson can communicate with him c/o Kirkham, P.O. Box 7584, Johannesburg, Transvaal. He is returning to Great Britain by air on June 11.

S.C.I. Food Group

A review of past meetings for the year 1947-1948 is included in the annual report of the Honorary Secretary of the Food Group of the Society of Chemical Industry, in which is also recorded that following representations by the committee Dr. L. H. Lampitt, the President, is now the Society's nominee on the National Consultative Committee of the Food and Agriculture Organisation of the United Nations. Membership of the group during the period under review had increased steadily, the present total of members being 1,037 compared with 1,014 a year ago. Of these some 350 members are also members of the Microbiological Panel and 280 belong to the Nutrition Panel.

Future functions of the group will include a visit to Eire in June, a second Conversazione on November 10 to be held in the United Dairies Central Laboratories, Wood Lane, W.12, by kind permission of the directors of that company, and the first annual Dinner-Dance to be held at Grosvenor House, on Monday, February 7, 1949.

Return to London

The accounts and shipping departments of A. Boake, Roberts and Co., Ltd., which were evacuated to Buckhurst Hill during the war, have now returned to the company's works at Stratford, London, E.15. The A.B.R.A.C. sales department and the sales division dealing with the food and beverages trade are now at "Ellerslie," Buckhurst Hill, Essex.

Obituary

Mr. Vincent Marcantonio, founder of the Empire Biscuit Co., Ltd., subsequently known as Embisco, Ltd., died on April 9, at the age of 64, after an operation.

He was one of four brothers who were brought up in the ice cream trade and then branched out in cafés. With his brother Raphael, he developed ice biscuit factories in Lambeth and Camberwell, before starting on his own account in Balham.

He was one of the founders of the old London Ice Cream Association and was a member of the committee for many years.

New Cheese Wrapping

It will soon be possible to make natural cured cheese available to the consumer in this country in as fresh a condition as the day it was prepared and, in addition, already packed by the manufacturer in suitable sizes, so eliminating time-wasting weighing and wrapping at the counter.

The long standing custom of keeping natural cheese fresh by wrapping in cheese cloth and dipping in hot paraffin, besides being laborious, is ineffective in preventing rind development. Now, however, cheese makers in the U.S. are delivering most of their products wrapped in Pliofilm, for natural cured cheese can be kept completely free from mould and rind formation through the use of this transparent wrapping material, evolved by Goodyear.

New Branches

Branch offices have been opened by Musgrave and Co., Ltd., at 89a, Clayton Street, Newcastle-upon-Tyne. Mr. W. J. Adams, B.Sc., has been appointed manager.

*

A new branch office has been opened by J. H. Fenner and Co., Ltd., at 86, Bridge Street, Sheffield, 1. Tel.: Sheffield 27774.

Cranes in Industry

Constructed for duty in a wide variety of services where increased production has introduced serious material handling and storage problems, Coles cranes, manufactured by Steels Engineering Products, Ltd., are of two main types, namely, the self-propelled fully mobile four-wheeled model, and the lorry mounted version. The automatic safe load indicator is arranged to work in conjunction with self-resetting contactors. A warning lamp situated in the driver's vision gives warning if loading is continued to approximately 10 per cent. in excess of the rated load for any position of jib, and the supply of current is automatically cut off by the contactors which come into action irrespective of any move by the operator.

Coated Tinfoil for Wrapping Cheese

Under the authority of the Dairying Industry Standards Committee of the British Standards Institution, B.S.1486 for coated tinfoil for wrapping cheese has just been issued.

It is well known that coated tinfoil of inferior quality will lead to the rapid deterioration of the cheese with which it has been used and the standard has, therefore, been prepared to lay down a minimum quality, although it is realised that wide difference in the hardness and ductility of coated foils may be required by cheese manufacturers.

The British Standard has been drafted with a view to:

1. Establishing a limit to the quantity of hardening constituents in the metal within the reasonable demands of the trade today.
2. Limiting the total impurities permissible in the metal.
3. Establishing tests that would indicate the suitability of the mechanical properties of coated foil and the protective value of the lacquer coating.
4. Setting forth the gauges of foil required.
5. Restricting the amount and establishing the quality of coating.
6. Establishing the limits of perforation beyond which the foil may be regarded as unsatisfactory.
7. Describing methods of sampling.
8. Describing methods of analysis and test.

British Industries Fair, 1948

SOME FURTHER EXHIBITS

The following are details of exhibits at the recent British Industries Fair which were received too late for inclusion in the May issue.

Birmingham.—Three models of H.F. generators, two of which were used to demonstrate particular aspects of H.F. induction heating, were included in the exhibits of Philips Electrical, Ltd.

A film depicting the entire processes of the company's Ebbw Vale plant, from the marshalling yards to the finished steel sheet and tinplate, was featured in two kiosks at the stand of Richard Thomas and Baldwins, Ltd.

A wide range of products including Morganite carbon bearings, carbon piston rings, and "Reservoil" bearings were included in the exhibits of The Morgan Crucible Co., Ltd.

A conveyor installation was featured at the stand of J. Collis and Sons, Ltd., who also demonstrated two stackers and a selection of trucks with capacities ranging from 10 to 40 cwt.

The main theme of the G.E.C. exhibit was export, the centre portion of the stand being devoted to an illuminated pictorial display of the variety of world markets supplied under the company's export programme.

A range of valves, diaphragm fuel cocks, and centrifugal pumps were exhibited by Saunders Valve Co., Ltd.

Olympia.—Demonstrating the variety of output, the central display of the stand of the Metal Box Co., Ltd., consisted of a new range of seamless aluminium containers which can be fitted with a number of different types of closures all of which render them hermetic against the ingress of moisture.

Some of the uses of the Teepol group of products in industry were shown at the stand of Shell Chemicals, Ltd., where models showing how Shell chemicals are helping to combat pests and diseases in the production of food were also exhibited.

Appointments

On the invitation of the Council of the British Refrigeration Association Mr. W. S. Douglas, B.Sc., has accepted office as an additional Vice-President of the Association for the year 1948.

*

The board of Huntley and Palmers, Ltd., has appointed Mr. Gordon W. N. Palmer, M.B.E., a director of the company as from April 1, 1948. Mr. Gordon Palmer is the younger son of the Hon. E. Cecil N. Palmer and a grandson of Lord Palmer, and is another representative of the fourth generation of the Palmer family actively engaged in the business.

*

In succession to Mr. J. W. Thomas, B.Sc., LL.B., M.I.E.E., who resigned to become Chief Education and Training Officer of the British Electricity Authority, the Governing Council of the British Engineers' Association (Inc.) have appointed Sir William Christie, K.C.I.E., C.S.I., M.C., as Secretary of the Association.

Mr. Norris E. Dodd, United States Under-Secretary of Agriculture, has been appointed Director-General of the Food and Agriculture Organisation in succession to Sir John Boyd Orr.

*

Mr. Charles McDougall, who has been associated with the business for over fifty years, has been elected President of McDougalls, Ltd., on retiring from the chairmanship of the company. He remains a member of the board and will act as deputy chairman. Mr. Kenneth A. E. Moore has been elected chairman and Mr. T. D. Craven has been appointed to the board.

Essence Prices

In view of the increase in the duty on spirits of wine by 20s. per proof gallon, the price of essences and other products containing spirit manufactured by W. J. Bush and Co., Ltd., will be increased to prices varying between 3d. and 4s. per lb. according to their spirit strength.

Big Dollar Contract

An order from the Netherlands Government worth £500,000, payable in U.S. dollars, for plants to distil fresh water from sea water to be installed in the Dutch West Indies has been received by G. and J. Weir, Ltd. Practically all the work on this contract will be carried out in the West of Scotland.

The plants for distilling fresh water from sea water are to be erected at Curaçao and Aruba, the island sites of vast oil refineries.

The boilers for the plants will be made at Renfrew by Babcock and Wilcox, Ltd., and the structural engineering work by A. and J. Main and Co., Ltd., under the supervision of Weirs, who will make the evaporating and distilling plants.

Errata

The price of the book *Concise Chemical and Technical Dictionary*, reviewed in the April issue of FOOD MANUFACTURE, was inadvertently quoted at 45s. The price is £8.

*

The advertisement of Spirax Manufacturing Co., Ltd., in the May issue was illustrated by a photograph of the late Mr. Charles R. Whittle, the music hall star, who was described as having "helped make famous the song 'I'm Twenty-one Today.'"

Although the company were informed on good professional authority that Mr. Whittle was associated with the song it has since been brought to their notice that the song was sung not by Mr. Whittle but by the late Mr. Jack Pleasants. Unfortunately the correction did not reach them in time for it to be carried out in their advertisement and they express regret for inconvenience which, as a result, may inadvertently have been caused to any party.

Omission

In the article entitled "Vegetable and Fruit Canning in Norfolk," published in the April issue of FOOD MANUFACTURE, the name of Wm. Brierley, Collier and Hartley, Ltd., as suppliers of the rhubarb slicing machine was inadvertently omitted.

Booklets Received

To mark the completion of ten years of oil refining operations in Great Britain, the Manchester Oil Refinery, Ltd., have issued a fully illustrated booklet describing their refinery and the wide range of products and their uses.

■

To assist refiners, blenders, distributors, and users of lubricants in their respective tasks, a booklet called *Lubrication Vade Mecum*, compiled by E. W. Steinitz, has been published by Leonard Hill Limited. A list of lubricants and key to their codes, lubrication charts based on classification of machinery and uses, and an alphabetical index of machines are included, while supplementary notes considering in more detail the specific conditions of lubrication for various machines have also been added. The lubricant specified for a given machine can be ascertained by locating the machine in the lubrication chart, noting the code number of the lubricant, and turning to the corresponding entry in the list of lubricants.

■

An account of the services offered to firms wishing to extend or initiate the export side of their business is given in a booklet issued by British Traders and Shippers, Ltd. The firm undertake complete marketing arrangements for overseas territories, act as selling agents or distributors, and provide through their market research service all the information necessary to establish a marketing campaign in the countries concerned.

■

Latest information on "self-service" collated by Mr. John Corina, deputy chairman of the Co-operative Union and a director of the Royal Arsenal Co-operative Society, has been published in booklet form by the Co-operative Union, Ltd. Mr. Corina completed an extensive tour in the United States last year, and the account is intended to give those interested a general idea of the scope and degree of "self-service."

■

The Central Council for Health Education have published a full report of their conference on food and drink infections held on October 9, 1947. (FOOD MANUFACTURE, 22, 11, p. 512). Details of the exhibition and the visits made in conjunction with the conference are included in the report.

■

Presented in such a form as to be of assistance to the managements of factories in which there is no full-time medical officer a booklet, *Skin Protection in Industry*, published by Rozalex, Ltd., gives information about the care of the skin and the prevention of industrial dermatitis by the use of barrier creams.

■

Arising out of the recapitalisation of Monsanto Chemicals, Ltd., some 3,000 new stock-holders have been acquired. In order that these new stock-holders might be given some background information on the chemical industry of Great Britain and the part played by the company in that industry, a booklet has been published incorporating the report of the directors and accounts of the company for the year ended December 31, 1947.

■

An account of the work done by the blind in a variety of industries is given in a brochure published by the National Institute for the Blind, included in which is a description of the work done by blind operatives in the bakery and confectionery trades as packers.

OBITER DICTA

● I tasted an "ethylene plum," which was food for the gods. —*John Bouverie in the "News Chronicle."*

● English beef and Welsh mutton have made our countrywomen what they are today.—*Lady Megan Lloyd George.*

● No, I can't say I ever have used any of these Ministry of Food recipes—I've laughed at them, of course.—*"Punch."*

● I don't think the public know exactly what they have been getting. Sausages are bags of mystery in fact.—*An analyst.*

● Ham is a commodity reserved for priority customers, canteens, and some restaurants.—*A member of the Gravesend Food Committee.*

● Sufficient natural food is the best health insurance. Without it, any Health Act will remain a dead letter.—*Dr. Griffith Evans.*

● There is plenty of food in Britain, but mostly of inferior quality and far from tempting. That we survive is a tribute to our digestion.—*A correspondent to the "British Medical Journal."*

● One of our councillors asked me the other day if I could give a job as registrar of births, marriages, and deaths of pigs. —*Mr. B. Llewellyn Griffiths, Clerk to the Monmouth District Food Committee.*

● We must find some way of putting an end to this international game of Beggar My Neighbour and develop a policy of sharing plenty rather than organising scarcity.—*Mr. Anthony Eden to the National Union of Manufacturers.*

● I do not consider the public is getting a fair deal. A lot of this meat could be used for manufacturing. You have to chew it for hours, and often you can't get the fork into the gravy, let alone the meat.—*Mr. W. J. Harrington, a Stoke Newington butcher.*

● The best way to cook a herring is to split it, remove the bone, dip it in a bowl of Scotch oatmeal, and then fry.—*Mr. R. Boothby, M.P.*

● That is quite wrong. I don't think you know anything at all about getting the flavour out of herring. You never fry them. You grill them.—*Mrs. Mann, M.P.*

Change of Name

The Norfolk Cold Storage and Ice Manufacturing Co., Ltd., whose factory was taken over in 1946 by Birds Eye Foods, Ltd, to develop the quick freezing process, has now adopted the name of Birds Eye Foods (Great Yarmouth), Ltd.

Physical Society Exhibition

Remote recording flow controllers, pH recorders, and gas-filled thermometer system portable temperature recorders were included in the wide range of recording and controlling instruments shown by Bristol's Instrument Co., Ltd., at the recent Physical Society Exhibition.

News from Overseas

Parma's Canning Fair

Open to all manufacturers of machinery in connexion with the canning industry, the third International Canning Fair is to be held in Parma, Italy, from September 8 to 19, 1948. Reduced travel rates for exhibitors and exhibits, temporary import facilities for foreign goods, and temporary patent protection for inventions shown at the Fair are announced.

New Food Preservative

According to investigations by the Tennessee Eastman Corporation of Kingsport, Tennessee, U.S.A., hydroquinone is perhaps the most satisfactory anti-oxidant for the prevention of rancidity in edible marine oils. In coming to this conclusion, says the company, it was influenced by the results of toxicity studies of a highly purified hydroquinone conducted at one of the leading U.S. universities for nearly two years. It adds that there is every indication that this hydroquinone will be safe for incorporation in edible products, and official approval for its use is anticipated.

Sugar in South Africa

According to a recent statement in the South African Parliament 50,000 tons of sugar were allocated during the year 1947 for the canning factories for making jam and for canned fruit. Exports of sugar during the crop years 1946-1947 amounted to 10,117 and 10,350 tons. During each year 10,000 tons were exported to Southern Rhodesia and the balance to neighbouring islands, such as St. Helena and certain African territories.

The total Union production during 1946-1947 was 474,769 tons, compared with 512,005 tons for 1947-1948.

No sugar had been imported in recent years up till October, 1947, but thereafter till the end of 1947 approval was given for the importation of 12,679 tons refined sugar, which is being used mainly by food manufacturers.

Canning in Russia

In the "May 1" jam factory.

The Russian food canning industry has been making great strides to catch up on the time lost during the war, one and a half million tins of conserved fish being produced by the "Mikoian" cannery at Astrakhan, the great centre for the Volga and Caspian fish industry, during 1946. Manufactured at the plant on a chain system, the filled tins are accumulated in the vast refrigerated warehouse.

Fruit and vegetable canning is also being carried out on a vast scale, at both the Tiraspol plant and the "May 1" factories throughout the Soviet Union.

Meatless Spread

Based on brewers' yeast, vegetable fats, flour, oats, and spices, a meatless spread is being manufactured by the Dutch firm of Poviet Producten.

Lyons Fair

Bakers' ovens and refrigerating equipment were included in the exhibits of interest to the food industry displayed at the Lyons Trade Fair held from April 3 to 12. One stand showed a patented method of treating wine by refrigeration to ensure the rapid precipitation of deposits.

Automatic Bakery Plant

The first of its kind in East Africa, a modern automatic bakery plant is to be installed by Whitehouse Bakery, Ltd., in Nairobi. Supplied by Baker Perkins, Ltd., the plant is fully automatic and includes the latest oven and wrapping machine. The new building has now been completed and will be partly air conditioned. Ice making plant capable of producing a substantial quantity of ice for the doughs is also included in the installation.

The confectionery plant, consisting of vacuum cookers, rotary sweet forming machines, soft centre filling equipment, and other auxiliary plant is expected to be installed before the end of the year.

Utrecht's International Competition and Exhibition

BUTCHERY TRADE'S TECHNICAL SCHOOL CELEBRATIONS

The First Netherlands School for the Butchery Trade at Utrecht, formed twenty-five years ago, celebrated its Silver Jubilee by an International Competition and Exhibition for the butchery trade from April 6 to 14. An International Butchers' Congress was also held on April 7.

There were 1,357 entries for the Competition from 570 different participants.

The Congress was attended by organisations of the meat trade in England (Institute of Meat), Belgium, Luxemburg, Denmark, Austria, and Holland, during which a discussion was held on technical education for butchers, the interchange of instructors and students, and a review of the meat position in different countries.

New Zealand's Development Plans

The New Zealand Board of Maori Affairs, exercising control over the investment of various Maori funds and land development schemes, announces that apart from dairy and sheep farming, Maori settlers on the land are being encouraged to undertake intensive horticulture. One small district in the Tauranga area supplied £9,000 worth of maize, onions, and potatoes in a recent year. In Wairoa, twenty-eight Maori families have cultivated 87,000 tomato plants to provide produce for a canning factory which has been opened.

Experiments are now being carried out in the growing of asparagus and sunflowers.

Some 2,000 Maori farmers have already been established under this new scheme, and the Rt. Hon. P. Fraser, New Zealand Prime Minister and Minister of Maori Affairs, recently paid an official visit to "Maoridom," to see how the work is progressing.

Ninety-nine schemes, comprising nearly a million acres, are being developed with State funds supported by limited capital from Maori trust organisations.

Pre-cooked Potatoes

A product known as "Speed-tatoes," pre-cooked potatoes packed in tin and almost entirely free of process flavour, has been developed by C. F. Buelow Co., Inc., of Seattle, Washington, and is now in retail distribution.

In the process potatoes are steam peeled, cooked under pressure for nineteen minutes, riced, and then dried for one and a half hours at 150° F. The finished product contains less than 5 per cent. moisture and weighs only one-seventh as much as raw potatoes.

Eire's Black Market in Pigs

CAMPAIGN AGAINST ILLEGAL CURING

The vigorous campaign against the illegal curing of bacon started by Eire's Minister for Agriculture, Mr. Dillon, kept inspectors from his department busy checking shops and bacon suppliers throughout the country last month.

The cumulative effects of low pig production over many years, and what has been described as efficient organisation on the part of illegal curers, are stated to have been major factors in the creation of a critical situation which threatened to leave Eire without bacon for many months.

Although there was no question of abolishing control of bacon prices, some curers maintained that there were large quantities of bacon in cold storage in the hope that these controls might come off. If that had happened prices would have jumped and small fortunes would have been made, as prices then would be at least £20 a cwt.

Pig production has fallen in Eire, but not so catastrophically as to justify the collapsed state of the bacon market. Some factories at the beginning of the year were finding it impossible to carry on, because the total weekly average of pigs reaching all Irish factories was under 3,000 compared with nearly 6,000 for the same period a year ago.

Curers competing for limited supplies were paying up to £10 15s. 0d. a cwt. for pigs, which they said represented a cured bacon price of £13 6s. 0d. a cwt. The fixed wholesale price of bacon is £10 10s. 0d. a cwt., so the retail trade was getting very little because curers could not get many pigs on such conditions as they were being outbid by black market operators.

Since Mr. Dillon commenced his campaign, "Stop Orders" have been issued in many cases where there were grounds for belief that the regulations had been infringed. The most important of these cases was one where a "Stop Order" was placed on the sale of a large quantity of bacon. If, on examination, it is found that the regulations were broken, it is understood that the owner will be prosecuted and that the bacon, if fit for human consumption, will be given out to wholesalers for distribution by quota in the ordinary way.

Bacon supplies are being kept under closer supervision, and frequent visits are being paid to hotels and to other places where bacon in substantial quantities is being handled.

Bacon curers, as a result of recent meetings, have formed a committee to ensure that supplies of bacon will be distributed to the trade on a *pro rata* basis and at the fixed price of 200s. per cwt.

As a result of this scheme some curers have since found it possible to distribute bacon for the first time for a considerable period. Under this system the price of pigs is expected to average from 185s. to 190s. per cwt. compared with the black market price of about 215s. paid recently.

The war against the black market in bacon has also made a difference in the number of pigs arriving at Irish factories for curing. A few weeks after the campaign opened the number of pigs received at factories was 4,123. This compared with 2,779 in the previous week.

Ten per cent. more bacon would be made available if the black market could be completely wiped out. More pigs are the real solution of the Irish bacon industry's problems, but the farmers say that there can be no substantial increase in the number of pigs until maize at a reasonable price and in plentiful supply arrives.

American Food Research

The purposes and policies of the Food Research Institute, Stanford University, California, are set out in the Institute's journal, the general objective being to promote understanding of food production, distribution, and consumption. Ancillary objects include efforts to improve basic data, to develop techniques of analysis, and to cultivate skill in interpretation and exposition.

Included in the January, 1948, issue are details of publications for 1938-1947, publications prior to 1938, and selected contributions for the period 1943-1947.

Milk in the Bakery

Complete information about milk and its uses in the bakery is contained in a new 108 page book issued by the American Dry Milk Institute, Inc.

Intended for practical use based on sound scientific facts, presented in understandable language, the book contains many charts, diagrams, and other illustrations.

Included in the material presented are sections devoted to definition, grade and composition of milks, methods of manufacture of concentrated milk products, nutritive value of non-fat milk solids, milk equivalents, storage of milk products, use of milk in bakery products, mixing, fermentation, make-up and baking of doughs containing milk solids, cost of using milk solids in bread, and a few basic formulae for common fermented baked items in which milk solids is an ingredient.

The book is a valuable reference work for all bakers who desire general knowledge on milk products and their specific uses in the making of better baked foods.

Tinplate and Canning in U.S.A.

Following a recent two-month tour in the United States, Mr. J. Ireland, M.C., B.Sc., Director of the Tin Research Institute, and Dr. E. S. Hedges, D.Sc., Ph.D., A.R.I.C., Director of Research at the Institute, report that the general opinion in the United States is that electro-tinning will eventually supplant entirely the hot-dipped process, as there will be a gradual increase in the thickness of the electro-tin coating which can be applied. The total tin consumption is likely to rise rather than fall. At present most electro-tinplate is made to carry 8 oz. per basis box of tin, but some 12 oz. plate and a considerable amount of 4 oz. plate are also made. The main factor limiting the tin coating thickness is shortage of tin, and manufacturers are ready to instal lines for 1 lb. electro-tinplate when tin is more plentiful.

The higher speeds and improved technical resources now available make heavier electro-tinplate an economic proposition; earlier technical difficulties encountered in the use of high current densities and in flash melting of thick coatings have now been overcome.

News from the Ministries

Appointments

At the request of Sir John Boyd Orr, D.S.O., M.C., F.R.S., J.P., LL.D., the Minister of Food has agreed to release Sir Herbert Broadley, K.B.E. (Deputy Secretary, Ministry of Food), for appointment as Deputy Director General of the United Nations Food and Agriculture Organisation.

*

Sir Basil A. Kemball-Cook, K.C.M.G., C.B., is resigning from the post of Divisional Food Officer, London. Mr. Lachlan Maclean, C.B., O.B.E., C.St.J., Director of Establishments, Ministry of Food, who is retiring from the permanent Service, has accepted an invitation to succeed Sir Basil Kemball-Cook.

Citric and Tartaric Acids

It has been decided by the Minister of Food that it is no longer necessary to continue to control the prices of citric and tartaric acids. He has therefore revoked the Citric Acid (Control and Maximum Prices) Order, 1942, and the Tartaric Acid and Cream of Tartar (Control and Maximum Prices) (No. 2) Order, 1944, as from April 21, 1948.

Registration of German Trade Marks

New Orders made under the Trading with the Enemy Act, 1939, carry a stage further the relaxation of Trading with the Enemy restrictions as they affect Germany.

Although these restrictions in regard to Germany have already been relaxed to a limited extent by the issue of previous Orders, persons in Germany have hitherto been precluded from taking steps (in the United Kingdom) to apply for the grant of a patent or the registration of a trade mark or design.

As from April 8, 1948, transactions will be permitted with persons in Germany in connexion with the submission by them of such applications; transactions in consequence of any such patents granted, or trade marks or designs registered are also permitted. Moneys accruing as a result of such transactions are not subject to Board of Trade or Custodian control.

These Orders do not affect the position of German-owned patents, designs, or trade marks granted or registered prior to the date of the Orders; these remain under Board of Trade and Custodian control.

Tare Allowance

Some packages of offal from the Argentine are arriving in this country wrapped in the usual stockinette but with an outer covering of heavy open mesh cotton material. Test weighings have shown that the allowance of 1 lb. for the usual hessian outer wrapper on bagged offal from the Argentine is inappropriate for this cotton wrapper, and it has been decided that an allowance of ½ lb. only shall be made when offal from the Argentine is issued in wrappers of this type.

Fuel Efficiency Committees Reconstituted

Opening the Wolverhampton Industrial Centenary exhibition today, Mr. Hugh Gaitskell, Minister of Fuel and Power, announced that he had reconstituted the Fuel Efficiency Committee organisation of the Ministry. This organisation consists of a central Fuel Efficiency Committee, and a Fuel Efficiency Committee in each Region.

The Fuel Efficiency Committee was first set up in September, 1941, under the chairmanship of Dr. E. S. Grumell, C.B.E., and has been active in furthering all aspects of the efficient use of fuel and power. As now reconstituted it will have the following terms of reference:

> "To advise on the application of measures promoting economy and efficiency in the use and consumption of fuel and power; to survey the progress of the organisations established for this purpose; to report the problems arising from these surveys which appear to require scientific investigation; to advise generally as to the lines on which a policy designed to raise the standards of utilisation of fuel and power can best be implemented."

Token Imports from Luxemburg

It has now been agreed that Luxemburg should be included in the countries participating in the Token Import Scheme in 1948.

Countries already participating in the Token Import Scheme are Australia, Belgium, Canada, Denmark, Finland, France, Holland, India, Italy, Pakistan, Sweden, Switzerland, and the United States.

Nut Kernels

The Nut Kernels Order, 1947, has been amended so as to permit the sale in the United Kingdom of peanut butter manufactured in Australia. Peanut butter is one of the miscellaneous manufactured foodstuffs which may be imported from Australia in limited quantities under individual licence.

The new Order, which came into force on April 11, 1948, also increases the wholesale selling price of desiccated coconut to take account of higher purchase costs. Supplies of desiccated coconut are very limited and are allocated only to manufacturers. Retail sales are prohibited.

The Tomatoes Order, 1948

An Order re-imposing price control at all stages of distribution on home grown and imported tomatoes came into force on April 27, 1948.

This Order does not, as in previous years, provide for the control of distribution. Distribution this year will be effected by a voluntary arrangement under which the National Farmers' Union and the Channel Islands Exporting Associations will ensure that, where necessary, loadings are made in consultation with the Ministry.

The maximum prices, which are prescribed for the period up to August 18, are substantially the same as those in the 1947 Order, apart from an adjustment between the primary and secondary wholesale prices. It is confidently anticipated that by August 18 supplies will be so heavy that price control can be lifted, if it has not been lifted before. If, however, the Minister has reason to believe that prices after that date will continue at a high level then a further maximum price schedule will be introduced.

The maximum price for all areas of Canary Islands tomatoes and other foreign tomatoes, except Dutch, will be 1s. 4d. per lb. until July 12, thereafter 1s. per lb.

Other important points about the Order are:

1. There is an alteration in the maximum price areas and certain areas in the North of Scotland are exempt from the Order.
2. Separate carriage allowances are prescribed for Channel Islands tomatoes.
3. The allowances for containers are the same as in the 1947 Order.
4. Licences issued to grower-wholesalers under the 1946 and 1947 Orders are preserved by this Order but relate entirely to sales to retailers at the primary wholesale prices.

Changes in Export Licensing Control

Changes in export licensing control made by a Board of Trade Order which came into force on May 1, 1948, include, *inter alia*, the deletion of the following items in Group 9, under the main cotton heading, from under the sub-heading "Knitted or crocheted goods wholly or mainly of cotton artificial silk or cotton and artificial silk, of the following descriptions: Piece goods of any width or length and stockinette sacks, bags, and wrappers."

This item now reads:

> "Stockinette sacks, bags, wrappers, and materials of the kind used for food wrapping."

Heat Treatment of Ice Cream

Regulations have been made by the Minister of Health and the Minister of Food extending for one year until May 1, 1949, the special defence available to defendants charged with an offence under Regulation 3b (iii) of the Ice Cream (Heat Treatment) Regulations, 1947. This action has been taken in view of possible difficulty in obtaining cooling apparatus.

The 1947 Regulation lays down that after the ice cream mixture has been subjected to heat treatment it shall be reduced to a temperature of not more than 45° F. within one and a half hours and shall be kept at such a temperature until the freezing process is begun.

Acetic Acid for Bakers

Arrangements have been made for dilute acetic acid 12 per cent. strength to be available for all bakers with a weekly sackage below 100 sacks for the control of "rope" during the coming summer. Through the co-operation of the yeast distributors, this acid will be distributed by them as required. No permits will be necessary, and supplies may be drawn from any yeast merchant as occasion demands. Since containers are difficult to secure, it is important that all empties should be returned to the distributors as quickly as possible.

Eighty per cent. acetic acid for bakers with a weekly sackage of 100 sacks and over has also been made available against a permit.

Since the acid is being specially released for the purpose of "rope" control, ordinary domestic vinegar should not be used.

Import Licence Procedure

It has been announced by the Board of Trade that all applications for import licences from any zone of Germany should now be made to the Import Licensing Department, 189, Regent Street, W.1, on the standard form ILD/A, and not as previously to the Sundry Materials Branch of the Board of Trade. Applications for licences made before April 19 will be dealt with by the Sundry Materials Branch under the existing procedure.

The attention of importers is particularly drawn to the fact that licences for imports from the joint Anglo-American Zones and the Russian Zone will be treated on a hard currency basis and will be generally confined to essential goods. For the time being, however, and provided that the contract is in sterling for immediate delivery, the same restrictions will not apply to the French Zone, though this concession is liable to alteration at short notice.

It will not be necessary, when applying for an import licence, for importers to produce evidence that their contracts have received the approval of the appropriate authorities in the respective Zones, but as a contract is not valid without this approval they are advised in their own interest to obtain it.

Commercial Conditions Overseas

BOARD OF TRADE'S NEW SURVEYS

Argentina, Economic and Commercial Conditions, 1947, published by H.M. Stationery Office on behalf of the Export Promotion Department of the Board of Trade (price 2s. 6d.), is the first volume in a new series entitled "Overseas Economic Surveys." These will replace the pre-war *Reports on Economic and Commercial Conditions*, the well-known "Brown Books" issued before the war by the old Department of Overseas Trade.

Written by the resident Commercial Diplomatic Officer or United Kingdom Trade Commissioner and his staff, these reports are designed to present an overall appreciation of the economic and commercial position in the country concerned. All aspects of economic life—finance, trade, industry, production, legislation, resources—are reviewed; detailed information is given concerning the market possibilities for specific types of goods, and particular attention is paid to developments in production and other factors which affect or are likely to affect the export trade of the United Kingdom.

Further reports to be published during the next few months include those of Belgium, Turkey, Brazil, and France. Reports on a number of other countries, including Canada, Switzerland, South Africa, Sweden, and Persia, are being prepared and should be available later in the year. Ultimately all important overseas countries will be included in the series, though its completion will necessarily take some time.

Meanwhile to meet the need for information of this nature, the "Reviews of Commercial Conditions," which were introduced in 1944 as an interim measure and which have proved successful, will be continued. Some of the existing booklets in this series are being revised and additional booklets will be published during the next few months.

Loan of Wheat to France

There will be a serious deficiency in French wheat supplies until the new crop is harvested in France this summer, and the French Government has asked the United Kingdom Government to lend sufficient wheat to bridge this gap. The United Kingdom Government appreciates the serious position in which France is placed, and while it is not possible to provide the whole quantity asked for, has agreed, as an exceptional arrangement, to divert to French ports for arrival before July 1, 1948, four cargoes of Canadian wheat amounting to about 34,000 tons. The French Government has undertaken to repay the wheat during the period August to December, 1948. The loan of this wheat will mean a regrettable reduction of our stocks of wheat between now and the harvest, but the ration will not be endangered. In making its decision the United Kingdom Government was actuated by a desire both to help France and to contribute to Western European co-operation.

Seizure of Food

The Seizure of Food Order, 1948, which re-enacts the provisions of the Seizure of Food Order, 1946, came into force on April 19, 1948, the only new provisions being technical. Authorised officers are empowered to seize food by serving a notice of seizure in the manner and form prescribed.

The provision that the Minister might deduct from the proceeds of the sale of a seized article any expenses incurred on his behalf in the seizure and sale of the article has since been deleted by an amending Order as from May 6, 1948.

Change of Address

The Export Promotion Department of the Board of Trade (with the exception of the Exhibitions Branch) has moved from 35, Old Queen Street, S.W.1, to Thames House North, Millbank, London, S.W.1.

The telephone number of the Department (VICtoria 9040) remains unchanged; the telegraphic address, however, is altered to Advantage, London.

Prices of Oils and Fats

No change will be made in the prices of refined oils and imported edible animal fats allocated to primary wholesalers and large trade users during the eight week period ending June 19, 1948.

Services to Industry

The German Division of the Board of Trade maintains an organisation called Technical Information and Documents Unit at 40, Cadogan Square, for the purpose of disseminating the results of technical investigations undertaken in Germany and also giving technical advice on wartime industrial processes in that country. The published CIOS, BIOS, and FIAT Reports are already well known through their sale by H.M. Stationery Office and the free distribution to libraries and scientific institutions throughout the country. It is not, however, so widely appreciated that in addition to, and in support of, these reports, T.I.D.U. maintains a large library of original German documents, treatises, and research reports. These documents (as distinct from reports) are available for consultation at T.I.D.U. and, moreover, facilities are provided for having copies made in microfilm, microfilm print, or photostat form at the cost of reproduction. Notification of the accession of individual documents to the library is made by the issue of F.D. summaries written in English on yellow foolscap paper. These summaries are sent to trade and research associations and to a limited number of firms whose interests fall outside the coverage of any trade association.

Another aspect of the work of T.I.D.U. which is sometimes overlooked arises from the close co-operation of the unit with its American counterpart, the Office of Technical Services, Department of Commerce, Washington. As a result of this co-operation T.I.D.U. has most of the material concerning enemy countries announced in the American Bibliography of Scientific and Industrial Reports under P.B. numbers. It is, therefore, advisable to check with T.I.D.U. before ordering from America any document or report bearing a P.B. reference number.

Information and Advice

Bakers' Piping Jelly

B.2433. *We require a recipe for the manufacture of bakers' piping jelly, using materials now available.* (Manchester.)

The following is a typical formula for piping jelly which may be used as a basis for experiment:

Gum tragacanth	2 lb.
Water	4 gal.
Glucose	40 lb.
Tartaric acid in 1 oz. of hot water	½ oz.
Essence and colour	*q.s.*

Soak the gum in 2 gal. of water for twenty-four hours. Stir up well and add the other 2 gal. of water and allow to stand for another twenty-four hours. Dissolve the acid in the ounce of hot water. Rub the gum through a fine hair sieve into a steam-pan. Place the glucose in another steam-pan and gently bring to about 180° F. and shut off the steam. The gum is next brought to the boil, and should be stirred all the time. Add the hot glucose, stir well, and bring to about 218° F. Rub all through a fine hair sieve. Add the flavouring, allow to cool, fill and place a paper disc that has been dipped in glycerine on the top of each tin. A pint of glycerine can be added to piping jelly when boiling, which will assist in preventing mould growth.

Bread Improvers

B.2438. *First-class bread improver required for use in bakery.* (London.)

The chief chemical improvers are:

Persulphates (trade name Salox)
Acid calcium phosphate (Ibex)
Potassium bromate (Arkady)
Chlorine (Beta Gas)
Nitrogen trichloride (Agene)

The last two are bleachers as well as improvers.

Persulphates are used extensively. Usually about ½ oz. per sack is the amount. Ammonium persulphate is the most popular salt, and this has a marked toughening effect on the dough as fermentation proceeds.

Acid calcium phosphate is the oldest and one of the most favoured improvers. This product is used in flour at the rate of 8 oz. to the sack of 280 lb.

Potassium bromate is a very powerful improver and even one-tenth oz. per sack has a marked influence.

There are several patents covering the heating of flour at certain temperatures in the presence of a current of air.

Information Supplied

B.2396. *Information on the production of sausage meat rusk.* (Angus.)

B.2398. *Suppliers of semolina for the manufacture of macaroni.* (Gibraltar.)

B.2401. *The manufacture of coffee extracts.* (Surrey.)

B.2412. *The manufacture of custard powder.* (Lancs.)

B.2415. *Information relating to the transformation of whale fat into oil.* (London.)

B.2416. *Suppliers of a salt dispensing machine.* (New Zealand.)

B.2421. *Suppliers of liquorice root and cloves.* (London.)

B.2426. *Names of manufacturers of machinery for packing and weighing sausage meat into Cellophane casings.* (Yorks.)

B.2430. *Suppliers of scientific instruments for use in the manufacture of apple concentrate.* (Kent.)

B.2431. *Address of conveyor belt manufacturers.* (Durham.)

B.2434. *Information as to the possible source of seed or plants in connexion with the growth of yerba maté.* (Australia.)

B.2435. *Manufacturers of plant for the production of margarine.* (New Zealand.)

B.2436. *Suppliers of filter pumps and cabbage chopping machines.* (Hants.)

B.2437. *Literature in connexion with sugar manufacture.* (S. Africa.)

B.2439. *Recipes for ice cream mixes.* (Glam.)

B.2441. *Information on the canning of soft fruits.* (N. Ireland.)

B.2447. *Manufacturers of a small hand-operated label gumming machine.* (Aberdeen.)

B.2449. *Fitters of oil firing apparatus.* (Sussex.)

B.2450. *Information in connexion with the manufacture of Filtragol and Pectinol.* (Norway.)

B.2451. *Suppliers of tomato purée and spices.* (Belfast.)

B.2452. *Suppliers of electric fat extractors.* (Lancs.)

B.2454. *Information on bottling olives and recipe for synthetic cream.* (Warwicks.)

B.2457. *Manufacturers of a jelly injector.* (Eire.)

B.2459. *Manufacturers of jam filling machinery.* (Kent.)

B.2461. *Name and address of manufacturers of a preparation for greasing or preparing bakers' tins.* (Beds.)

B.2462. *Suppliers of a small mill for grinding granulated sugar into icing and fine castor.* (S. Rhodesia.)

B.2464. *Suppliers of transparent colourless containers.* (Lancs.)

B.2465. *Manufacturers of machinery for making rice flakes and roasting.* (India.)

B.2470. *Suppliers of machinery for pressing laundered clothes.* (London.)

B.2471. *Suppliers of moisture-proof wrapping materials.* (Norfolk.)

B.2482. *Manufacture of imitation cream.* (Lancs.)

B.2485. *Information on the manufacture of soluble casein.* (Durham.)

B.2487. *Plant for jam manufacture.* (London.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

593,059. TEXTILE APPLIANCES, LTD., and STALKER, A. J.: Apparatus for delivering a liquid in measured quantities.

593,158. ASHBY, E. N.: Stoppers for bottles and like containers.

593,164. PENNY, JOHNSON, LTD., and CLARSON, E.: Machines for slicing vegetables and for similar purposes.

593,192. NEWTON, E. P. (Bronander, W. B.): Wrapping machines.

593,211. COOK, H. M.: Means for preserving foodstuffs and other perishable commodities.

593,236. BISHOP, E. W. J.: Labelling devices.

593,260. THORNTON, A. A. (Gridley, E. H.): Manufacture of tea.

593,264. BAKER PERKINS, LTD., and TUNLEY, A. A.: Driving rods and like devices for the aprons or plaques for chocolates, confectionery, or other goods.

598,170. CO-OPERATIVE WHOLESALE SOCIETY, LTD., and ALDERSON, A.: Collapsible cartons.

598,205. INDUSTRIE-EN HANDELMAATSCHAPPIJ "DER VUURSLAG," COMM. VENN.: Baking oven.

598,241. WORLD PRODUCTS CORPORATION: Vitamin A containing preparation, and the manner of its production.

598,254. BROOKES AND SONS, LTD., W. J., COULSON, F. W., and BANFIELD, W. T.: Manufacture of bread.

598,271. PAGE, H. E.: Refrigerating apparatus.

598,297. NORTH AMERICAN HOLDING CORPORATION: Grading machine.

Abstract of a Recent Specification

Machines for Slicing Vegetables

This invention relates to machines for slicing vegetables and for similar purposes, and has for its object to provide an improved machine primarily intended for the production of potato chips, the machine of the present invention being of the kind wherein potatoes or other vegetables gravitate from a hopper or other receptacle into a cavity in a carriage reciprocated above sets of stationary horizontal and vertical blades disposed so as to slice the potatoes or vegetables which project below the cavity as the carriage is traversed, pushers being arranged to pass through the spaces between the blades.

A machine of the kind referred to is characterised in that the reciprocating carriage below the hopper is provided with lateral bearings sliding on parallel horizontal runners at the sides of the carriage and with a box-like aperture wherein the vegetables are travelled and through which they gravitate into the way of spaced horizontal pushers on the carriage below the aperture, the stationary horizontal and vertical blades being provided in alignment with the spaces between the pushers. The cutting edge of an upper horizontal blade projects in advance of the cutting edges of a series of vertical blades below it, and a second horizontal blade is disposed between the upper blade and the base of the machine, the cutting edges of the vertical blades projecting in advance of the cutting edge of the lower blade. 593,164. *Penny, Johnson, Ltd., and Ernest Clarson.*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

ADEXA.—647,133. Edible oils and vegetable fats (for food). **London Oil Corporation, Ltd.,** 153-161, Camberwell Grove, London, S.E.5; Manufacturers.

SOYRONI.—647,643. Soya flour and preparations made from soya beans for use as food or as ingredients in food. **Soya Foods, Ltd.,** 40, St. Mary Axe, London, E.C.3; Manufacturers.

ZELEC.—647,792. Refrigerating apparatus and installations, and parts thereof and fittings therefor. **Zero Electric, Ltd.,** 85-86, Ablewell Street, Walsall, Staffordshire; Manufacturers.

MALTOMIC.—657,183. Malt and malt extract. **Edme, Ltd.,** Imperial House, 84-86, Regent Street, London, W.1; Manufacturers.

ARBACO.—657,506. Fish paste, pickles, tinned and bottled soup, tinned and bottled vegetables, tinned and bottled fish, and *hors d'œuvres*. **George Pendleton Roberts,** trading as **Robinson Batty and Co.,** 19, Temple Street, Liverpool, 2; Merchant.

New Companies

Kirby Refrigeration, Limited. (440098.) 17, Blandon Road, Bexley, Kent. Nom. cap.: £500 in £1 shares. Permt. dirs.: L. J. Kirby and Mrs. A. M. Kirby, 17, Blandon Road, Bexley, Kent.

British Deepfreeze Corporation, Limited. (440142.) Abford House, Wilton Road, S.W.1. To carry on bus. of manufacturers of and dealers in refrigerators, etc. Nom. cap.: £100 in £1 shares. Dirs.: F. Hagley, Abford House, Wilton Road, S.W.1.

Refrigeration Corporation of Great Britain, Limited. (440174.) Abford House, S.W.1. Nom. cap.: £100 in £1 shares. Dirs.: F. Hagley, Abford House, Wilton Road, S.W.1.

Geoffrey B. Field, Limited. (440260.) Vinegar Yard, St. Thomas Street, S.E.1. To carry on bus. of dealers in edible and other produce, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: G. B. Field and Mrs. G. V. Field, both of 37, Barnfield Avenue, Shirley, Surrey.

H. A. Wilcock, Limited. (440311.) "B" Block, Smithfield Market, Manchester, 4. To take over the stock and assets of a fruit and nut merchant and commission agent carried on as "H. A. Wilcock" at Smithfield Market, Manchester, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: Mary Wilcock, One Ash, Alithwaite Road, Grange over Sands, Lancs; H. B. Heywood, 75, Clitheroe Road, Longsight, Manchester.

Hussmann British Refrigeration, Limited. (440483.) To carry on bus. of refrigeration and air-conditioning engineers, etc. Nom. cap.: £50,000 in £1 shares. Dirs.: Sir Percy H. Mills, K.B.E., Beasley Manor, near Stratford-on-Avon; Wm. B. McMillan, address not stated. Sub.: N. H. Dixon, 86, Hampton Lane, Solihull.

Notarianni Brothers (Bridlington), Limited. (440551.) 251, High Street West, Sunderland. To carry on bus. of manufacturers of and dealers in ice cream and iced confections, etc. Nom. cap.: £3,000 in £1 shares. Permt. dirs.: B. Notarianni and Gino Notarianni, both of 251, High Street West, Sunderland; S. Rossi, 15, Prince Street, Bridlington.

Rock Villa Pickles, Limited. (440564.) 117, Moss Road, Chadsmoor, Cannock, Staffs. To take over bus. formerly carried on by G. H. Poyser, trading as "Rock Villa Pickles" at 117, Moss Road, Chadsmoor, Cannock, Staffs, and to carry on bus. as manufacturers of and dealers in pickles, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: not named. Subs.: G. H. Poyser, 117, Moss Road, Chadsmoor, Cannock, Staffs; H. Rees-Jones, Woodlands, Wolseley Road, Rugeley.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.